Digital Digest

Vol. 3 No. 3 **Devoted entirely to Digital Amateur Radio Communications** May/June, 1990

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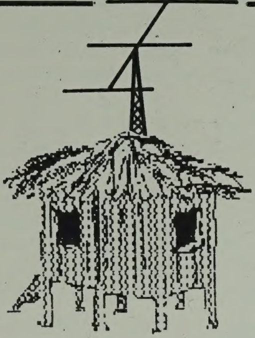

From The Publisher's Shack

Every year , Dayton serves as the center for new product introductions. Dayton 1990 was no exception. Many of the new "black boxes" unveiled this year represented the newest innovations in amateur digital communications.

The hot technical topic was DSP - Digital Signal Processing. Several of the manufacturers and software developers were on hand to discuss and showoff the fruits of their labors. It was all quite exciting. Unfortunately, anyone hoping to be the "first on the block" to bring home one of these new "black box" marvels was most likely disappointed. Prototypes were all that were available in most cases, so we'll have to wait a few months longer before we can plop down the cash for these new additions to the shack.

What DSP is, what it does, what it will do, and what it all means to you and amateur radio will be the subject of discussion and reporting in this, and in future issues of Digital Digest.

Dayton was also where the jolting announcement was made that Ham Radio Magazine would cease publication, having been purchased by CQ Communications, Inc. (more info inside).

Since donning my own publisher's cap, I have had the opportunity to meet others of the same persuasion. Two of whom I have become personally acquainted are Craig Clark, NX1G and Terry Northup, KA1STC. They are two fine people who did a great job with Ham Radio and will now be assuming new roles and responsibilities with CQ. We wish them all the best of success in their new environment.

Speaking of publications, we've made more changes to the Digest. We have gone a point size larger in type, changed the name of one column and added two others. We hope you'll find these changes to your liking. Now, the Digest should not only be easier to read - but there is also more to read.

(cont'd on page 31)

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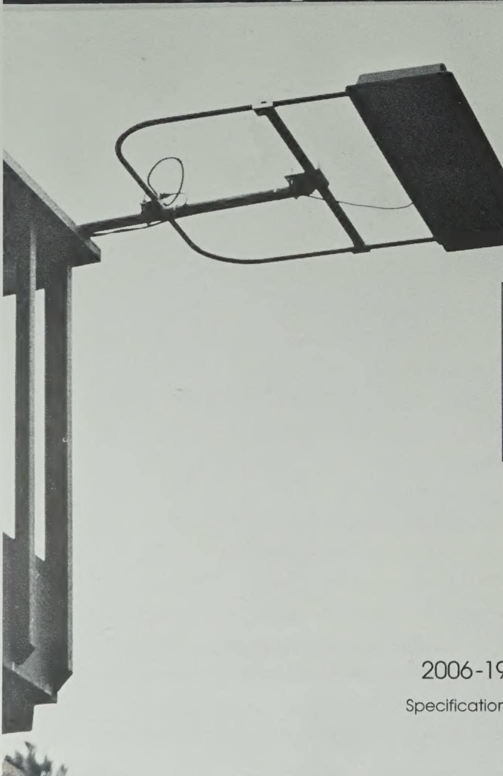

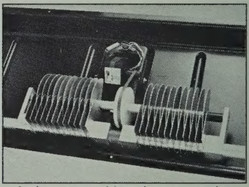

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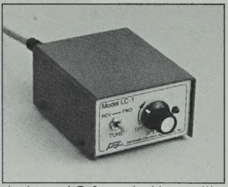

IsoLoop LC-1 control box with variable speed tuning.

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AEA also provides technical support from the factory or through your personal computer and modem on CompuServe's HamNet. If you are already a CompuServe member, just type GO HAMNET at any CompuServe prompt. For a free introductory CompuServe membership, call 1-800-848-8199 and ask for representative #48.

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NEW PRODUCTS AT DAYTON...

Ten-Tec introduced its Argonaut II and Delta II HF transceivers. These are basically the same radio; the Argonaut version is QRP with .5-5 Watts RF output. The Delta is 20-100 Watts. Transmits 160-10 meters and receives 10 kHz-30 MHz. LCD display, 31 non-volatile memories, flexible dual VFOs, digitally-controlled passband tuning.

Kantronics introduced the Data Engine TNC to support speeds in excess of 56 kbaud (ships with 1200 baud modem). The Kantronics Telemetry Unit connects weather sensors to any TNC; just connect and receive temperature or other weather readings. Kantronics has a factory BBS evenings and weekends at 913/842-4678.

QRZ industries displayed its line of low-cost natural voice digitizers. These small boards can store and play back up to 10 seconds of high quality voice and are highly programmable with switches, keypads, timers and external software or repeater controllers. They may be used as IDers, beacons, "voice keyers" for contests. (QRZ, PO Box 160, Piedmont, SC 29673. Ph: 803/269-0000)

Grace Communications announced the PackeTen high speed, multi-port packet switch supporting up to 4 MB/sec. (Grace, 623 Palace St., Aurora, IL 60506. Ph: 708/897-9346)

Didah Publishing demonstrated "From Beverages Thru Oscar", the world's largest database on Amateur Radio. FBTO is a 52,880 reference volume to 80 years of published articles on all aspects of radio, available on microfiche, hard copy and PG disk formats. The editor is Rich Rosen/ K2RR, professional engineer and former Ham Radio Magazine editor. The search software is fast and very easy to use. (Didah Publishing, PO Box 7368, Nashua, NH 03060)

AEA announced a new LA-30 1200 watt HF Linear Amplifier for 160-10 meters. AEA also debuted a new LPF-30 Low Pass Filter and a Fast Scan Television Transceiver to operate in the 900-930 MHz range. (AEA, P.O. Box 2120, Lynnwood, WA 98036)

Source: W5YI Report

DAYTON SPOTLIGHTS DSP...

Through lectures and product introductions, this year's Dayton Hamvention acquainted a lot of hams with Digital Signal Processing (DSP), a technology well entrenched in the commercial communications world...and destined to change the face of the amateur hobby in the years to come.

DSP involves the use of special microprocessors to digitize (convert into numbers) analog signals, manipulate the numbers for a desired purpose, and then convert them back into analog signals (voice, CW, images) that the human brain can comprehend. The processing is done with software instead of filter parts like inductors or capacitors.

DSP is used throughout the long-distance telephone network: in radio and TV broadcasting; in facsimile, medical and military applications. The cellular telephone industry in Europe and the U.S. is starting a conversion to a DSP foundation. Spread-spectrum and Compact Disk products are based on DSP. (Even the Teddy Ruxpin bear has a talking DSP chip inside!)

In Amateur Radio, DSP will have applications numerous enough to boggle the mind. Some immediate uses include better HF modems for packet and RTTY transmission; special modems for satellite work; and programmable filters and noise cancellers for CW and SSB operating. Your PC could become a spectrum analyzer with a DSP board, at a price far lower than commercial analyzers. The Kenwood TS-950SD transceiver has a DSP module that enhances transmit performance.

DSP-based direction finders could allow your repeater to output screen maps of the source of any received signal -- in real time! DSP can generate and recognize speech and can help us realize a true digital voice packet network.

We got the feeling that DSP is really imminent when Dayton Technical Excellence Award winner Bob McGwier/N4HY in the Packet Forum spoke of "writing" modems for various ham applications. No longer will modems and filters be assembled from electronic components - they will be computer programs that are written just like any other program. The programs may be downloaded into DSP units from disk, or stored on plug-in ROM chips that can be updated whenever some improvement comes along. Tucson Amateur Radio (TAPR) and AMSAT are deep into development of DSP boxes and plug-in PC boards to be offered to the amateur community at large.

Why DSP?

N4HY described the background of his DSP program: "The reason TAPR, AMSAT, and the others want DSP is that we just got sick of buying new modems. We needed to do something that would decrease your long term expenditures for modems. If you do it in DSP, where the modems are software based, you would not have to buy a new modem every time a new widget happens.

"As you know, 300 bits per second is just not good enough for HF with the FSK that is being used now. If you want to have a good modem for HF, it is practically impossible to do it any other way than with DSP, period. If you want 600, 1200, 2400 bits per second, you must do it with DSP. Now there are implementations of this in military use. But hams are not going to spend $50,000 just to run 2400 bits per second on HF.

"Well, in ham radio we could pay a few hundred dollars for a DSP box or plug-in card for your computer, one that is open-architecture and freely available for whoever wants to experiment with it. The ARRL has its HF modem and protocol design contest. Those modems could be put on the TAPR/AMSAT TMS320C25 card and probably on DRSI and AEA cards as well. We are about done with the schematics and will have a prototype for the TAPR/ AMSAT DSP card this summer.

"The idea is that you want to be able to do satellites, packet, 9600 bits per second, slow-scan TV weather satellite, on and on and you don't want to pay $1200 for a Robot SSTV unit and a few hundred dollars or a PSK modem or a AO-13 demodulator. You can do it all with one box. The entry price is going to be several hundred dollars. AEA has announced that the amateur list price for its DSP box will be $760.00. The intent is for the TAPR/AMSAT board to sell for under $300 as a kit."

Source: W5YI Report

Digital Digest

-PACKET

by *Lynn W. Taylor, WB6UUT*

463 Myrtle Street • Laguna Beach, CA 92651

A Packet Tutorial

At local club meetings, people often come up to me and ask "how do I operate packet?"

There are some differences between operating packet and operating other modes, but things aren't that different. In this article I'll be talking about some of the things the new packeteer should know, the essential TNC commands, plus some good and bad practices.

As in previous articles, I'll be using the commands as used in the AEA PK-232, PK-87 and PK-88. Since the commands I'll be talking about are the most basic commands, and virtually every TNC follows the TAPR command set, you should be able to find these commands in your TNC manual.

Before you get on the air:

In previous articles, we've talked about what you should do when you first get on the air. Let me touch briefly on one important point: virtually every TNC will work (a little) with the factory default audio level adjustments.

Finding the best audio level for your station will really speed up your packet operation, and greatly reduce your impact on your local network.

Getting to know your TNC:

Virtually every TNC has three modes: Command mode, Converse mode, and Transparent mode.

In Command mode, you are talking directly to your TNC. You can tell you are in command mode by the "cmd:" prompt which will appear on your screen, and you may enter any command given in your TNC manual and the TNC will interpret the command. The TNC is in command mode when you first turn it on.

In Transparent mode, everything you type is "data" and is going to be sent out over the air. This mode is intended for computer-to-computer operation, particularly with software which was not originally designed for packet and cannot deal with the extra messages which come from the TNC. It is also used by many BBS programs, and some terminal programs for binary file transfers. Transparent mode is usually not used by "keyboard" stations, since it results in many more (very short) packets, and does not offer the conveniences available in Converse mode.

The normal way to get from Transparent mode to Command mode is to wait one second, press Control-C three times, then wait one second.

Converse mode is the most commonly used TNC mode, and is best for keyboard to keyboard QSOs and in general anytime someone is typing on a keyboard and going directly over the air. In this mode, many keys take on special meanings: Control-X erases your currently typed line, Control-R will restore current line, the Backspace or Delete key deletes the last character rather than sending a backspace or delete over the air, and Control-C takes you back to Command mode.

One important advantage of Converse mode is controlled by the FLOW command: as you type a line, any incoming text will be held until you finish typing your current line, and sent to your screen when you hit the return key (or when you reach PACLEN).

Two other modes which may be of interest are KISS mode and Host mode.

KISS mode (for "Keep It Simple Stupid") is used by programs like TCP/IP which use the TNC as an intelligent modem and generate their own protocol.

Host mode is a machine-to-machine interface which leaves the "smarts" of the TNC intact and replaces the "human" interface with a machine interface which is totally unambiguous. While it is very easy (with a little practice) for humans to figure out what came over the air, it's hard to explain that to a computer. Host makes really slick packet software possible.

If you have a program which needs KISS mode or Host mode, it will either take care of getting in and out of that mode for you, or tell you what you need to know to set up your TNC.

Okay, let's get into actually operating.

Calling CQ:

Many on packet these days don't really know how to call CQ, but it's really very easy: just go to Converse mode, and then hit the return key.

The only commands you need to know are the CONV command (to get into converse mode) and the UNPROTO command.

UNPROTO sets the address your CQ packets will use, and is usually set to "CQ." If there is a high-level digipeater in your area, you can use UNPROTO to give a path through the digipeater. If WA6HJF is a high-level digipeater in your area, setting UNPROTO CQ via WA6HJF will do the trick.

Monitoring and answering a CQ:

The reason people don't call CQ is probably because no one watches for CQs. The commands you need to know here are MONITOR and MTO.

Setting MONITOR 1 will show all of the UI frames in your network. UI frames are broadcast frames, and CQ is one form of broadcast. Higher numbers for MONITOR will show more frame types, up to 6 which shows virtually everything. MONITOR Y is equivalent to MONITOR 4.

Setting MTO YES CQ will show only those frames sent to CQ -- you will see ONLY the CQ calls. This can filter out all of the BBS mail lists and other garbage that may be flying around your area.

Another handy command is MFILTER. Setting MFILTER 7 will filter out all of the bell characters in monitored frames. As an aside, sending strings of bell characters is pretty annoying, and putting them in mail messages and beacons is a sure sign of a poor operator.

If you see a CQ, the originating station's call will appear first, followed by any digipeaters used, then the destination (CQ).

Having a QSO:

To start a QSO, go to Command mode and type C (short for connect) and the call sign of the station you want to talk to. If I want to talk to WA4EGT, I type C WA4EGT and press return. If Jeff is around, the connection is established and we can talk.

If the station is not local, and you need to digipeat, just add the word "via" and the list of digipeaters you need. To talk to KB6YOM, I type C KB6YOM via WA6HJF.

When the QSO is finished, go to Command mode, type D (short for disconnect) and press return to break the connection.

Another useful command here is MCON -- Monitor while Connected. I recommend setting MCON NO (or MCON 0) so you won't be confused by mixed QSO text and monitored frames on the screen.

Knowing how to use the TNC is just one aspect of operating packet, and there are some common practices I'd like to see stamped out, so I'll drag out my soapbox and talk about what makes a good operator.

Line lengths:

I don't know how many contacts I've had where I sit waiting for the other station to say something, then suddenly get hit by about three and a half lines of text, then another long wait, then more text with each line ending right in the middle of a word which just continues on the next line.

Of course, if the other station says something I want to answer, I have to either type right into the middle of this unsightly blob of text, or wait for the monologue to finish.

With other stations, I get their thoughts in nice, one line groups, and due to the FLOW capability I mentioned earlier, their lines are nicely separated from my text on a line-by-line basis, and I can answer just like a QSK CW contact, or a full-duplex phone link-up.

The difference is simple: one station is hitting return on each line, while the other guy just types until he's darned well finished and finally hits return. The second guy is making every effort to USE the flow mechanism, and the first every effort to DEFEAT it.

Let's all get in the habit of hitting return on every single line, okay?

Before someone suggests it, let me also say right now that PACLEN does not insert carriage returns or control line length. Unless your software does word-wrap for you, hitting return really means hitting return.

Prosigns:

For the first couple of years, no one used prosigns (the "K" used on CW and RTTY to tell the other station when you are through transmitting) on packet. This practice came about later when newcomers started sending the mammoth lines discussed above, destroying the formatting if both stations were typing at once.

If both stations hit return on every line, we need never "take turns" but operate "full duplex" at all times.

While I'm on the subject, the "SK" before you disconnect is fine, but since call signs are part of every single AX.25 packet, is there ever a reason to send your call over the air as part of a the text of a packet?

Courteous disconnects:

How many times have you been half way through typing what is probably one of the most clever and informative things you've ever sent over the air only to hit return and see this:

Okay, 73! * DISCONNECTED**

When you are talking to someone, and it's time to end the QSO, go ahead and say "73," then give the other guy the chance to say his goodbye as well.

Disconnecting before the other guy has a chance to finish his thought is the packet radio equivalent of hanging up in the middle of a telephone conversation, and can be just as irritating. The extra time is well worth the courtesy.

Other aspects of packet:

This article has only briefly covered the basics. There is a lot more to packet radio than just this little bit.

While practically any book on the subject will tell you all about NET/ROM, Bulletin Boards, Wormholes, Gateways and the like, the best way to find out what is available in your area is to get on and talk to people! Experiment! HAVE FUN! For those on CompuServe, your comments may be sent by CompuServe Mail to 74176,52, and general comments of a non-commercial nature may be sent to WB6UUT@WK6K.#SOCAL.CA.USA.NA. □

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Digital Digest -DATACOM

by **Norman Sternberg, W2JUP**
279 Adirondack Drive • Farmingville, NY 11738

The Digital Lid

By now, those of you who have been reading the Digital Digest have probably gotten your individual and collective bellies full of packets and protocols and processors and the like.

Various writers have shown you what packet and AMTOR and computers are all about. You probably have gotten at least the general flavor of what's going on in amateur digital radio these days. So let me depart from the normal run of topics, and introduce you to what I call "The Digital Lid".

Perhaps some newcomers to our fraternity may not be aware of what the expression "Lid" means. To be honest, "Lid" is a pejorative term - a negative word applied to some radio operators.

A "Lid" is not a good radio operator. In plain English, a "Lid" is a LOUSY OPERATOR.

In communications, the term "Lid" dates back to the earliest days of the operator's craft, and probably even further back to the era when the Morse telegrapher was the principle means of data communications.

In those ancient times, the measure of an operator's quality and expertise was taken NOT by how many words per minute the person could copy, or how many countries or stations he could work, but rather by the excellence of his manipulation of the Morse key and his operating procedures.

A "good" operator was known by the literal, sometimes arrhythmic accuracy with which he formed Morse characters and words; the dots and dashes for each letter or number, the spaces between letters and words. Some operators could actually be recognized by the "swing" of their hand-keying. "Swing" meant the subtle departures from "perfect" characters that lent a very distinctive or unique "flavor" to his sending. Good operators were known by their "fists".

Good operators were also recognized by how many "repeats" they requested, the precision with which they formatted radiograms, the smooth manner in which they sent the messages, typed the received traffic, kept their station logs and even by how they maintained the ship or coastal station's equipment (which frequently was the radio operator's responsibility).

When we amateurs gained RTTY back as part of our privileges back in the 'fifties, many of us began to do battle with our "green keys" monsters, those noisy, clattering, oil stained, ink spattered clunkers that many of us came to know and love.

And more than just caring for the machines - there was the whole question of the "TUs". "Terminal Units" - ah yes, we made our own in those days - you couldn't buy them. You had to build your modulator/demodulator from scratch.

We also had to deal with the messy ink ribbons, rolls of paper and punched tapes, and the high-voltage loop supplies. We even had to change some of our ways to fit in with new requirements imposed by those big electromechanical teleprinters. Our operating habits took on a new aspect to fill the needs of the then-new mode.

When we got into the Great World of RTTY, we had to reckon with things we never dealt with before:

- the length of the line one typed - how many characters
- the number of carriage returns and line feeds
- the specific characters on each station's keyboards
- what kind of keyboard did the other guy have
- the different RTTY speeds
- adjustment of keyboard contact genertors and distributors

In short, when we entered the RTTY mode, we had to deal with a multitude of things that were never before part of the amateur radio craft. The "good" operators did what they had to do; they transferred their same sense of "professionalism" from Morse to RTTY.

- Good operators started each transmission with a couple of carriage returns and line feeds. This ensured that the other guy's printing head was returned to the left-hand margin and on a new, blank line, without "pile-ups" at the right-hand edge of the page, without lots of "garbage".

- Good operators typed a line up to perhaps 69 or 72 characters, and then typed a couple of carriage returns. This allowed for sluggish printer head returns on the other guy's machine and a line feed to the new line.

- Good operators never typed more characters than could fit on a single line. They never forced the other guy's print head to pound holes through the paper and the ribbon in the same spot at the right-hand edge of the page. (There was no "word-wrap on the teleprinter machines).

- Good operators, whenever possible, prepared their messages on punched tape for later transmission. Awkward though it was, it frequently allowed minor editing to correct simple mistakes.

Fortunately, today's digital operators don't have to cope with messy machines and rolls of teleprinter paper and punched tape and testy terminal units. The computer and microprocessor-based data controllers have taken most of the "work" out of getting on the air in our digital modes.

But, as odd as it may sound, we can see by casual observation of our RTTY and AMTOR channels, and yes, even sometimes on packet radio, that the "Lids" have come to populate our digital modes just as they have in the older transmission schemes.

In the same fashion as "good operators" became separated from "Lids" on Morse and voice modes, we've come to see "Lids" on our digital modes. As strange as it may seem, we see them on RTTY, on AMTOR, and even on packet radio.

Believe it or not, this has nothing to do with whether or not the operator can type. In these days of computer terminal emulators and buffered split-screen programs, poor operating cannot be excused by a lack of typing skill. That is strictly a cop-out.

But I digress. Let's examine some of these new forms of Lid-ism created by the technology revolution. I call these new life forms "Digi-Lids". Some are more virulent than others. In the more densly-populated environments, the Digi-Lid may actually infect and destroy all available channel time.

We can now identify several different forms of Digi-Lid.

1. The BAUDOT-LID - likes to start with simple stuff. If it's been around for more than 30 years, it must be proven by now. Still owns and uses a Remington or Smith Corona typewriter.

2. The ascii-lid - likes the additional speed and hates being burdened with or restricted to those tacky UPPER CASE letters that make everyone look like "they're shouting at me!". Frequently comes from the UNIX world and programs in C.

3. The AMTAMTAMTOR-LID - understands the need for error correcting protocols. Depends on error correction to help conduct contest and DX exchanges without risking errors in the RST 599 report, or losing a two-letter state abbreviation, or zone, county or oblast number.

4. The Packet-LID - our most technically advanced "Lid". Knows the basic differences between a "1" and a "0" and can usually sign his name in either pen or pencil. Frequently enters amateur radio directly from the "Main Frame" world. Usually respects anything that uses a chip with more than 1000 devices on it.

5. The ALL-MODE Lid - the most dangerous form of Lid-ism. By virtue of its built-in flexibility, this virulent life form can infect and destroy ALL modes of digital operation. The ALL-mode "Lid" is found on all bands, using all modes except Morse. True ALL-MODE "Lids" eschew Morse - they know that experienced Morse operators recognize their computer-created perfect keying, triple their speed and change the weight and "swing" of their keying so that the ALL-MODE "Lid's" program can't decode the stuff. This forces the ALL-MODE "Lid" to copy manually, which he usually can't do at 65 WPM.

Now that we've identified these general categories of "Lids", let's look at the general characteristics of each different life form.

- BAUDOT-LIDS and ascii-lids start their transmission WITHOUT sending <CR> <LF>, so that your display cursor picks up from wherever it may have been in a screen full of garbage characters. This helps increase the profitability of the local optometrist shop, and provides you with a Basic Introduction to Cryptography.

- BAUDOT-LIDS, ascii-lids and AMTAMTAMTOR-LIDS end their transmissions without sending <CR><LF>, so that the next station - who's another "Lid" - starts where the first "Lid" left off. This reinforces the on-screen vision tests created by the "Lids" in the previous paragraph.

- ascii-lids send lots of RYs without knowing that RY doesn't serve the same purpose in ASCII as it does in Baudot. "Lids" don't know about "U*U*U*U*". They don't know that "RY" in Baudot translates into "U*" in ascii. Nor do they really know why we use it.

- BAUDOT-LIDS and ascii-lids always send at least ten lines of CQ. This is guaranteed to put the receiving station to sleep and avoid excessive QSOs and undue stress on solid-state final amplifiers.

- AMTAMTAMTOR-LIDS send at least ten lines of CQ in FEC to demonstrate their undying admiration for errorcorrecting protocols.

- AMTAMTAMTOR-LIDS start FEC transmissions with several lines of RYs. This guarantees that no one can synchronize with their FEC transmissions or answer their CQs. This also helps prevent excess QSOs and reduces channel occupancy, thus conserving valuable spectrum.

- Packet "Lids" never change any timing or link parameters in their TNC. This helps them show their clear respect for the manufacturer's wise choice of default values. This clearly falls in line with the advanced Packet "Lid" who said, "if they wanted different values, they woulda put 'em in there in the first place".

- ALL-MODE "Lids" send lots of RYs in any mode that allows typing RYs. This includes Morse Code and is guaranteed to aid in increasing one's capacity for understanding the code and improve one's general level of Morse Code skills.

- ALL-MODE "Lids" use their knowledge of advanced communications technology to experiment with exotic keying and modulation methods. One common experiment demonstrated by these life forms injects AFSK tones into their microphone jacks and uses VOX keying to avoid stressing the PTT line. This is especially effective in ARQ and Packet modes, and guarantees that their radio's duty cycle will not be stressed or exceeded by unnecessary QSOs.

- The ALL-MODE "Lid" also injects very large amounts of AFSK tones into his transceiver so as to make sure his CQ calls are heard on as many channels and frequencies as possible at the same time, regardless of frequency or mode actually in use.

So, there you have a brief summary of the characteristics we all know and love in the Digital Lid...an extension of the Regular Lid. Perhaps not all of these characteristics are clear to you, nor may you have observed all of them. But once observed, you'll live a long time without forgetting them.

Remember -- be kind to your Digital Lid -- you may have been one of them yourself at some time. ☐

ENERGY NETS...

Since QRP Sprints, Contests, Field Days, and Disaster Preparedness Programs give bonus points for non-commercial alternative electric power sources, readers should know about "Home Power" (Hydryo, Solar, Wind) Hams: KE5HV, KG6MM, N6HWY, and KB6HLR.

Regional Home Power Nets may be heard on the following frequencies:

- 7.230 MHz on Sundays at 1330 Pacific, Central, and Eastern time.

- 3.900 MHz on Wednesdays at 2000 Pacific, and Eastern time.

- 14.290 MHz on Sundays at 1900 UTC.

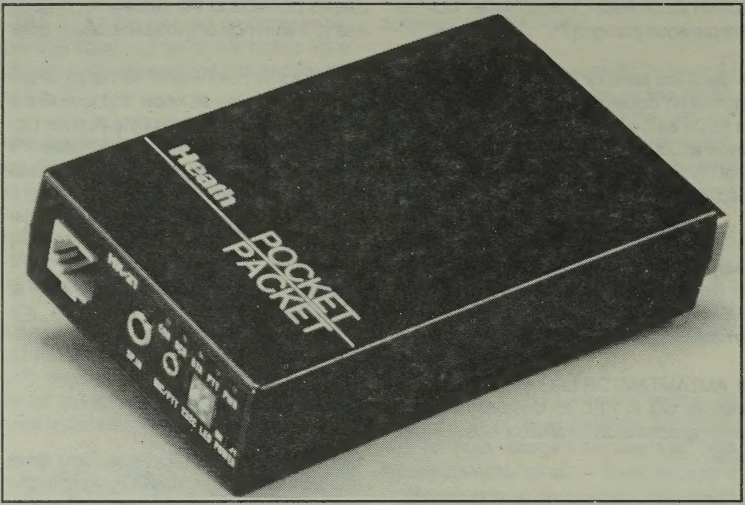
Novices, look for Dave, KB6HLR on the following frequencies: 7.107 to 7.110 MHz on Wednesdays at 0300 UTC, and on Saturdays at 0500 UTC.

Weekend hands-on assembly and construction training seminars are frequently offered around the nation. For an informative, illustrated magazine about product sources, design and installation of personal photovoltaics, hydro electric, and wind power systems, send your name and address to: Home Power Magazine, P.O. Box 130, Hornbrook, CA 96044-0130. ☐

Source: QRP Quarterly
Article by: Jeff Wilson / SWL

The Heath Pocket Packet

A review by Jonathan L. Mayo, KR3T
3908 Short Hill Drive,
Allentown, PA 18104



Most all amateurs are very familiar with Heathkit products; many a ham has used a Heathkit transceiver or accessory. Heathkit was one of the first commercial companies to introduce packet radio TNCs (Terminal Node Controller). Heathkit licensed the TAPR TNC-1 design for their first packet radio product, the HD-4040. Heathkit went on to introduce the HK-232, a copy of AEA's PK-232. The HK-21 Pocket Packet, Heathkit's latest packet radio product, is the subject of this review.

The Pocket Packet

The first thing I noticed about the Pocket Packet was its size; it is a very compact unit. But the Pocket Packet is no lightweight when it comes to capabilities. The Pocket Packet comes with a now-standard TAPR-2 command set in a 32K ROM as well as 32K of battery backed RAM. The unit supports the AX.25 Level 2 Version 2 protocol. A fully featured remote mailbox system is also built-in the unit. Although the Pocket Packet is a very capable TNC judged by its capabilities, it is the unit's small size and low power requirements that make it truly unique.

Physical Design and Features

The Pocket Packet measures in at 2.5 inches wide by 4.25 inches deep by 1 inch in height. The case is black plastic. The back panel contains a DB-25 socket for connection to a RS-232 compatible terminal. The radio interfacing ports are located on the front panel. A micro-barrel power connector is located on the right side of the unit. These connectors are discussed later in the section on interfacing.

The front panel contains five indicator lights. They are color coded so that they can be discerned in dim light. The PWR (power) indicator lights whenever 10 to 13.8 Vdc is supplied to the unit and the power switch is turned on. The CON (connect) indicator lights whenever the Pocket Packet is connected, or linked, to another packet station. The STA (status) indicator lights whenever there is user information contained in the Pocket Packet's memory that has not been acknowledged (received successfully) by the packet station the Pocket Packet is connected to. The PTT (Push-To-Talk) indictor lights whenever the Pocket Packet is transmitting. The DCD (Data Carrier Detect) indicator lights when a signal is being received by the Pocket Packet. By monitoring the status of the indicator lights, it is possible to keep track of exactly what the Pocket Packet is doing.

The Pocket Packet (or any hardware TNC for that matter) serves as an interface between a terminal and a transceiver. The basic packet radio station is composed of three main components: a terminal/computer, a TNC (Terminal Node Controller) and modem, and a transceiver. The TNC is the "heart" of a packet radio station. The TNC organizes and controls the transmission and reception of the data.

The Pocket Packet is actually a small microcomputer; the digital section of the Pocket Packet is based around a Z-80 microprocessor. The Pocket Packet (and most other TNCs) also contains a built-in modem. The modem (MOdulator DEModulator) converts the digital signals used by the TNC and terminal into analog signals which can be transmitted over radio. On the receiving side, the modem converts the analog signals back into digital signals. The built-in modem in the Pocket Packet is configured for the Bell 202 standard, which is commonly used for packet operation on VHF frequencies.

Manual

Heathkit is well known for the excellence of their manuals, and the Pocket Packet manual is no exception. The manual is divided into three main parts. The first section covers interfacing the Pocket Packet to a terminal and a radio. The next section explains how to test and adjust the Pocket Packet. The last part covers the operation of the Pocket Packet. All of the available commands are thoroughly covered, many with detailed examples. An operational schematic is also included. On the whole, the manual is adequate for the experienced packet operator. However, if you're just starting out in packet radio, you'll probably find some supplementary material necessary. As an added convenience, the pages are in a three ring binder that allows the manual to lay open without any problem.

Interfacing

The Pocket Packet must be interfaced to a terminal and radio. Any RS-232 compatible terminal may be used; most operators use the serial port of a microcomputer running terminal emulation software. Be sure to consult the manual regarding RS-232 cabling before attaching the Pocket Packet to your PC. If you are using a TTL compatible terminal such as a Commodore 64, you will need a level converter.

There are two methods for connecting the Pocket Packet to a transceiver (usually a 2 meter rig). Since a majority of Pocket Packet owners probably use the unit in a portable station with a 2 meter HT, Heathkit thoughtfully provided a cable for direct connection to most Heath, Icom, and Yaesu HTs. The cable plugs into the speaker a microphone jacks on the HT. This is quite a convenience as anyone who has interfaced an external PTT circuit for a HT can attest. In fact, the interface I built some years ago for connecting a TAPR TNC-2 to an IC-02AT is almost as big as the Pocket Packet itself. You can also use a more conventional cable to wire the Pocket Packet to your transceiver. This cable is actually a four conductor telephone cable that attaches to the Pocket Packet with a modular plug. Check your transceiver's manual for the proper wiring.

The terminal baud rate is set with the ABAUD command. The Pocket Packet has an automatic auto-baud routine that properly sets the baud rate at power-up. The built-in modem's baud rate is limited to 1200 baud. The manual contains all the information you will needed to get the Pocket Packet interfaced properly.

Operation

My evaluation station consisted of the Pocket Packet (with its optional internal, rechargeable battery pack), an Icom IC-02AT 2-meter HT, and a Toshiba T1000SE portable computer running ProComm Plus. The battery pack installs easily inside the unit, which opens after removing a single screw. The battery pack is recharged though the external power connector located on the right side of the unit.

I experienced no problems with the unit at all. In fact, I left it running for several days straight (a common occurrence in most packet stations) on external power without observing any deficiencies. The software command set is straight TAPR, so most packet operators will not even have to refer to the manual.

Conclusion

I have found the Pocket Packet to be a capable unit. Because of its small size, the Pocket Packet is an ideal portable TNC. If you are looking for a basic, reliable VHF TNC, the Pocket Packet is certainly worthy of consideration. You sacrifice no performance compared with larger TNCs and gain the advantage of extreme portability. The HK-21 Pocket Packet, which comes assembled and tested, sells for $199.95. The optional internal, rechargeable battery pack (which I consider a necessity) sells for $17.95.

For more information on the Pocket Packet, consult your Heathkit catalog or write Heathkit, Benton Harbor, MI, 49022. ☐

STS-35/SAREX-II Mission Delayed...

NASA managers recently announced their decision to delay the launch of STS-35 due to a problem in a freon cooling system designed to keep the temperature of electronic instruments in the ASTRO-1 Observatory payload within safe limits. The repair of the faulty cooling valve in Shuttle Columbia could delay the launch several weeks. It is hoped that Columbia will not have to be rolled back to the Orbiter Processing Facility for this work. On this STS-35 mission, payload specialist Ron Parise (WA4SIR) will be the station operator of WA4SIR-1 for the Shuttle Amateur Radio Experiment (SAREX) that will consist of a ROBOT packet station and voice operation on 2 meter FM.

Based on information from NASA press releases, it appears that the STS-35/SAREX mission will not be launched before the first week of June. And that depends on how well this never-done-before repair goes. As soon as ARRL/AMSAT officials have been notified about the new launch date, all pertinent information will be issued immediately via ARRL bulletins, ANS bulletins, and AMSAT Nets. ☐

Please Note:
If you have news and information of interest to the digital amateur radio community, please let us know!

AMSAT HF NET SCHEDULES

With events occuring so quickly in the world of amateur radio satellites, the quickest place to find information about operational news is on one of the many weekly HF AMSAT Nets. The following is a schedule of some of these nets:

DAY	TIME	FREQUENCY	NCS	COMMENT
Sunday	09:00 UTC	14.280 MHz	ZS6AKV	AMSAT-SA Net
Sunday	10:00 UTC	3.685 MHz	VK5AGR	AMSAT Australia
Sunday	19:00 UTC	14.282 MHz	WD0HHU	AMSAT International Net
Sunday	19:00 UTC	21.280 MHz	W8GQW	Simulcasts On AO-13 when in View On 145.955 Mode B
Sunday	23:00 UTC	18.155 MHz	N4QQ	Excellent DX Windows
Tuesday	9:00 P.M. EDT	3.840 MHz	W8GUS	AMSAT East Coast Net
Tuesday	9:00 P.M. CDT	3.840 MHz	W0CY	AMSAT Mid America Net
Tuesday	9:00 P.M. PDT	3.840 MHz	KI6QE	AMSAT West Coast Net
Saturday	15:00 UTC	28.460 MHz	WB2YGA	AMSAT Beginner's Net
Saturday	10:00 UTC	14.280 MHz	PA0DLO	AMSAT European Net
Saturday	22:00 UTC	14.282 MHz	ZL1WN	AMSAT South Pacific Net

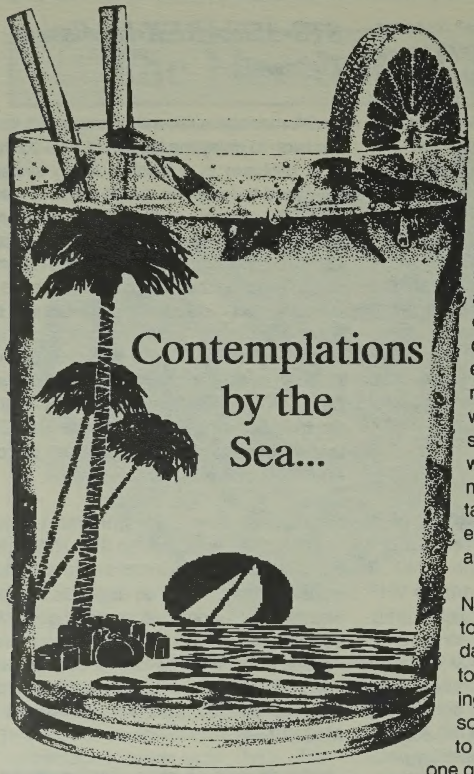
In addition to these weekly nets, there are also AMSAT Operations Nets held on AO-13 on a regular basis. The Operation's Net Schedules are published by AMSAT VP of Operations, Courtney Duncan (N5BF). If you are unable to copy any of the above nets, the AMSAT News Service (ANS) bulletins are found on many packet radio BBSs throughout the world. The ANS bulletins contain the latest operational information.

The AMSAT/DRIG land-line BBS contains not only the current ANS bulletins for the week but also the bulletins for the past several months and other timely information. The AMSAT/DRIG BBS can be reached at (214) 394-7438. Check into the AMSAT Net nearest you and stay up to date in the exciting world of OSCAR satellites.

Source: AMSAT News Service

BITS & BYTES

by Lacy McCall, AC4X
3001 Zelda Drive • Montgomery, AL 36106



Contemplations by the Sea...

Sitting in a quiet lounge chair recently, in Key West, overlooking the Atlantic surf, while I soaked up a few of the late afternoon rays, I had a chance to ponder a lot of things. It occurred to me that I was doing exactly what I wanted to do at the moment. Well, maybe not exactly the thing I wanted to do most, but close. I was wasting time and really enjoying it. Around me were quite a few beautiful sights. The Atlantic, ships sailing north and south, and a few bronze beauties.

Now if you know Key West, you know you had better take your own bronze beauty with you, because those you encounter, may or may not be the gender you expected. Realizing this, I enjoyed the sea, sails and the time to think.

One thing that never entered my mind while doing all this heavy thinking was Ham Radio and much less anything "digital." It was absolutely marvelous therapy for the soul. You too, can cleanse your spirit by wasting a little time. Since that particular afternoon, I have observed other wasteful things and would like to share a few. This may be a list of the all time best ways to waste time!

THE HAMFEST . . .

First, lets talk about going to a Hamfest. If that doesn't show you a lot of wasteful energy, you are not looking. Have you ever seen so many people sitting around and acting like they enjoy the inside of some dull arena so much. Seldom do many of the table dwellers rise. They just sit. I observed recently, that when the Hamfest was over, many of the sitters were still sitting. Since I left I am not sure whatever happened to them. They made no effort to move, clear their tables, pack up, or do anything else. These sorts surely know the art of wasting time.

Not far behind are the guys who go to Hamfests and spend a couple of days talking on their Handi-Talki's to each other. They talk in the parking lot. I assumed each needed some direction, and found the way to the entrance, but since I followed one group, I found out that I had been wrong. We all went the wrong way, in spite of the constant communication.

Inside, the mikes were at attention and draped over the shoulder. What was not clear was whether or not these hams ever looked at all the products and displays? Probably, they were just informing those yet to arrive about the great items to see.

The majority of those that toured the booths, spent most of their time examining the hardware. In spite of the current thrust toward computer driven radios, there seemed little interest in the software at all. I watched numbers of people examine every item of a setup using a computer, and several radios with digital devices attached. Rarely did anyone bother to look at the computer screen which contained detailed information about the setup. A little reading could have saved a lot of time.

Any ham knows that you can spend a lot of money at a Hamfest, and most wives think their ham husbands 'waste' a lot of money there; but never forget how good a hamfest is for wasting time.

TELEVISION . . .

Tell your friends that you only watch the news. I am sure you also tell them that you read Playboy to read the articles. Since most people are honest with themselves, only you know the truth. You really watch television to get some of that valuable 'waste' time. If something edifying comes on, it can mess up a really good nap or daydream, so don't let the remote control rest. Switch every little while to be sure you are covering the most topics.

It happens that I am one of those that thinks that TV has changed the world forever. I also think that there is a lot on the air that is of great benefit, well done and worthwhile. However, most of what most people watch, helps waste time. They seem to enjoy it, so why not? Just another way to let it pass.

RIDING IN A CAR . . .

Since the automobile became a fixture in America, auto riding has been a wonderful pastime; or maybe better stated as a wasteful pastime. As a teenager, we cruised the drive-in restaurants, the local main streets and anywhere else that we could find other cruisers. Today in this enlightened age, cruising is still a national pastime among the younger set.

If you need to get somewhere, for a really legitimate purpose, and must go by car you are fortunate; you can waste time and explain it away as justified. Turn up the music, and let Whitney Houston lead the way. Waste it and enjoy it, but don't complain that the drive was unproductive, because it probably was.

You may happen to have a two meter rig in the car, and listening to the local repeaters as you travel about is always interesting. Not only can you get directions if necessary, you can hear a lot of other wasting time too.

TALKING TO A FRIEND . . .

This is never a waste of time, if there is no microphone involved and the topics are of mutual interest. One of the most rewarding and least wasteful events in the human experience is interchange with another person, so I could never add this to the list. If you don't like to waste time, but do like to be rewarded, ask a friend to have lunch with you. Take time to chat, listen, and cover a lot of mutually interesting topics. You will find that time will fly by even faster than when wasting time, and you will receive more than you gave. This kind of personal interchange is one of the real benefits of ham radio. Getting together, face to face, over a cup of coffee or lunch is very common and a trait that I hope amateur radio operators never lose.

HOW OLD ARE WE?

Recently, I have had occasion to be at several Hamfests and talk to and visit with a good many amateurs. I am encouraged about the younger generation, and even quite a few older hams that are just getting into the digital modes.

It does appear however, that the older generations outnumber the younger by quite a large number. I am wondering about how it might be to visit a Hamfest or similar amateur gathering in twenty years.

While in Dayton, I had a chance to talk to several people involved in providing equipment for the amateur market. I asked what they thought about the future of the hobby, since someone has said that the average ham is 51 years old. The responses varied, and it was obvious that many in the industry serving our hobby are concerned. Although no one was candid enough to share any secret market research, I am sure it has been done.

Those of us who are interested in perpetuating the hobby should give some thought to how this can be done. With the older population, in a few years, there may not be too many Americans left to talk to. In other countries, I suspect the situation may be somewhat better and more young hams may be coming into the group.

The other pressure on our hobby comes from the value of the spectrum to commercial interests. If we continue to diminish in numbers, we may soon find that we don't have nearly the space we now enjoy. Also, manufactures may not continue to offer so many new items if the market is smaller; and those things sold in small volume usually are more expensive.

It is extremely curious why the ARRL is not more vocal in trying to increase the ham population. They will say it is not so, but what is necessary is a lot of imagination and leadership. It does not appear to me that the ARRL is doing much other than reacting to whatever happens, and I don't sense that there is any notion that the future may not be bright.

So far, I have been reluctant to enter the No-Code argument. Since I enjoy the CW, I understand how much fun it can be. However, many don't share that interest, and it is obvious from listening on the bands, that many hams throw away their key after obtaining their license. Why did we require them to take a code test anyway? If they don't want CW, why not just restrict them from using that portion of the band. More than likely, if any part of our hobby will survive in years to come, it will be morse code. Those that like the code, are the most devoted and among the leaders. They, as a group, probably will persist whether or not all others know the code or not.

One thing that can be done, and most often is not, is the maintenance of club stations. Since the equipment is so expensive today, many may be unable to get a good start without benefit of a community station. This too, is a great way to attract high school and college students, who are probably light years ahead of most of us with regard to computers and other current technology. Let's offer young people an easy way to get to know the hobby.

If you know a young person who has a technical leaning, please encourage he or she to take up ham radio. What we need is new young blood. The enthusiasm of youth will be good for us all.

EASTER PARADE . . .

No the Dayton Hamvention was not on Easter weekend, but it did definitely share in the spring fashion parade. This year was my first time to make the pilgrimage to Dayton, and I can say I learned a lot; most of which will not make it into this article.

What I did do, was spend several days observing Ham fashion. Before continuing, it is fair to state that Digital Digest has no chance of replacing Esquire, but it does not hurt to report our current dress and what seems to be in vogue.

Prior to my journey to Dayton, I was not aware that so many adult males wore T-shirts. These shirts themselves were interesting, because most were smaller than the bodies they contained. Some did have some really interesting statements to make, but most just appeared to have been selected from the top of the clean laundry stack.

The second hot fashion at Dayton, and most all other ham gatherings is the cap. If the cap wearers had not been covered in radios, I could have easily thought I was at a little league coaches convention. The things that the caps do however, is offer an easy way for others to recognize a callsign; so there is a good purpose. Hams do need to talk to the coaches about what looks good in a cap and how it should be properly worn. It is not good dress to have the hat cocked too far back and is really tasteless to have it askew to one side.

Before leaving the cap, it should be noted that the most interesting one I saw was the one with the solar powered fan in the bill. If you wear one of those, please use caution not to get your ducky tangled in the fan blades.

The most outstanding fashion item was the coat and tie. It was very clear who was a seller and who was a buyer. The sellers almost always had shirts with ties and the buyers T-shirts. I found that curious, because I thought that when in Rome, you dress like a Roman. It should have been completely unnecessary for any vendor to have a badge, just the tie was enough. From now on, the sellers, should take note and come to the hamfests with company logos on their T-shirts. Then, they can don the company cap, look like the company softball team, and fit in much better.

What not to wear and the least popular fashion in thing at Dayton was the pink shirt. Unfortunately, the first day I wore one. A friend, unnamed here, who is also a fashion illiterate had on a pink shirt and we observed only one other the first day. You may rest assured that I will never be so uncouth again.

INSIDE TRACK . . .

The Dayton Hamvention, is much more than a place to go and see the latest radios

(cont'd on page 23)

Digital Digest

DIGITAL QRP

by **Mike Bryce, WB8VGE**
2225 Mayflower NW, Massillon, OH 44646

The Care & Feeding of Gel/Cell Batteries

Last month we looked at some of the different types of Gel/Cell batteries available to us.

This month we'll take a closer look at keeping those batteries charged and ready to go. A gelled battery can be used in a variety of applications; many with unique operating or cost considerations. As a result, several solutions have been developed to assure the best performance possible under extreme conditions.

There are two different techniques for charging gelled batteries; constant current and constant voltage.

As the name implies, constant current charging, which in its simplest form, is like force feeding; the battery is forced to receive a constant amount of current egardless of its needs. Although charger component economy is achieved, it is sometimes done at the expense of recharge time or service life if the current is not set properly. Too high a constant current will shorten battery life and service time. A very good example of constant current charging would be emergency lighting systems and trickle chargers.

When trickle charging a gelled battery, a rate of 0.5 to 2.0 milliampers per rated A.H. capacity of the battery is recommended.

This range of currents will maintain the battery at maximum capacity. However, a very long period of time will be required to recharge the battery following use.

If the current to the battery is increased to shorten the recharge time, the battery will be continually overcharged. This will prematurely age the battery. The result will be shorten battery life span.

Constant voltage charging is exactly as the name implies. We set the voltage to the maximum allowed by the battery under fully charged conditions. The current the battery draws from the charger will be whatever the battery wants. In some cases, we must use current limiting to protect the charger. The battery will not be hurt in most cased. The initial current is usually 3 to 4 times the the 20 hr rate. For a 20 Amp hour battery, the initial current would be 3.0 to 4.0 amps.

The current acceptance of a gelled battery being charged will vary depending on the rate of the preceding discharge, time since discharged, depth of discharge and to some extent, battery temperature.

The gelled battery can be charged at rates greater than the recommended 3 to 4 times the 20 hour rating current. In fact, gelled batteries which were discharged at the 1 to 5 hour rate have been 97% recharged in 2 to 3 hours using unlimited current chargers.

Though it is possible to charge the batteries very rapidly, this procedure is not normally recommended. Since gelled batteries will accept very high currents, I recommend current limiting the charger to reduce its component power ratings while improving its portability, economy and safety.

Also, unlimited current charging increases the electrolysis of the moisture in the electrolyte resulting in increased gassing and premature drying. It can also produce internal heating and hot spots which can also shorten the service life of the battery.

Normally the best overall performance and life is obtained when the current allowed to the battery is approximately 3 to 4 times the 20 hour rate.

When the recommended constant voltage and limited current charging technique is used, the recharge tine can be estimated. Naturally, the time will vary with the current limit selected but approximately 120% of the capacity removed will have to be restored though charging. The charger can usually be sized such that the battery can be fully charged in less than 16 hours. However, 80% of the capacity is restored in approximately one-half the time required for a complete charge.

While most of us know about lead-acid giving off hydrogen gas while charging, is is an often overlooked fact that gelled batteries also produce gas. To minimize this effect, most gelled batteries has utilized lead-calcium, rather than lead-antimony. This not only minimizes the gassing resulting for the electrolysis of the electrolyte moisture but also greatly extends the self and service life of the battery

There are several ways to charge a gelled battery. I prefer the use of a common three terminal voltage regulator chip. The popular LM-317 will supply up to 1.5 amps of charge current. This charger will be of the constant voltage type. A small schematic is shown for a simple gelled battery charger. Note that most of the parts can be purchased from the local Radio Shack store. Be sure to heat sink the regulator. The device will generate quite a lot of heat at the maximum current. The 2.5 ohm resistor is for current limiting. To reduce the initial current, increase the value of the 2.5 ohm resistor. Remembering to allow for heat dissipation. Use a large wattage resistor.

Well that's about all the space we have this month. Next issue, I'll be showing you a different type of charger for emergency power batteries; SOLAR POWER. ☐

COMMODORE HAMS...

A & A Engineering, Inc. offers you a "Choice" means of getting on packet. Now you can choose between the popular software-based DIGICOM>64 system designed by Barry Kutner, W2UP or the NEW DIGICART>64... It's Digicom>64 in a cartridge! NO DISC DRIVE REQUIRED. Either way, you get an effective, and economical approach to joining the packet excitement.

DIGICOM>64 software-based program requires a simple modem interface which plugs directly into the C-64 cassette port or can be remote mounted via cable. A watchdog timer, reed relay PTT and PTT inversion are included. No alignment is required. Operates VHF & HF packet. The Digicom>64 modem, including FREE software is available wired(#154-ASY) $79.95 or in easy to assemble kit(#154-KIT) $49.95 (add $2.50 s/h).

DIGICART>64 features include autobooting and the ability to re-write and save parameters and stored text without a disc drive. Supports all the disc functions available in the regular program. Uses and requires same modem as software version mentioned above. Digicart>64 assembled and tested (#167-ASY) $69.95 or kit version (#167-KIT) for only $49.95 (add $3.50 s/h). VISA/MC ACCEPTED. CA residents add 6.25% s/tax. Order from: A & A Engineering, 2521 W. LaPalma #K, Anaheim, CA 92801. Ph# 714-952-2114.

QRP - "Quit Running Power"

I didn't do it on purpose, I swear it was an accident, I really was looking for an SB-200.

It all started when some of my buddies who hang out on the local 147.00 repeater convinced me to go to the Dayton hamvention in 1986. It was to be my first trip to the Mecca of the ham world.

It was cold (I had to buy a warmer jacket), It was raining (I had to buy a hat), and all my buddies were working all the good DX (I had to buy an amplifier).

But what junk!!! But it didn't matter. I picked up lots of wire and coils to make more wire antennas and matching networks, and some big capacitors. Then it happened, I saw a solar panel, and I just had to buy it. It was big enough to run a kW (uh, make that a watt).

Since I live in a neighborhood that outlaws all outside antennas, my wire antennas are hidden in the woods behind the house. Running an amplifier could start a forest fire. There was no way I could ever put out a "BIG SIGNAL" from this QTH, so why try? I decided to go in another direction, cheap antennas and low power.

If anyone ever hears me, I'll have an unbelievable story to tell everyone (but, I didn't expect it to be thrilling too. More about that later). So I began to look around for a small rig. I came upon the QRP ARCI booth inside the commercial exhibit area. Talk about little rigs, these things were just about two inches by three inches, and smaller.

It was there that I bought two QRP kits, one was a receiver board for 40 meters and the other was the matching 2 watt transmitter. I got a few crystals and then went shopping for a cabinet and a tuning capacitor for the receiver.

I was glad to leave Dayton. It was like two trips in one, my first and my last but, what the heck, every ham has to go to "ham heaven" at least once.

The little kits went together easily. The receiver picked up the entire 40 meter band (no tuning required), and the transmitter put out a solid two watts. I hooked it up to my big 40 meter full wave square loop and worked not one station, I called CQ forever.

The following weekend the weather turned nice and sunny. So it was time to try out the solar panel. Out on the deck I hooked up that ugly little transceiver to the panel and antenna, then I zero beat the transmitter frequency and listened. There it was, CQ CQ DE W8 something or other, so I answer.

He hears me!!! I felt like a novice again, only this time I could understand what the other guy was saying. I couldn't believe it... just me, my antenna, my ugly rig, and the SUN! No batteries! I was hooked. QRP really works! QRP forever. I couldn't wait to tell the guys. You know the guys? The ones with the big antennas and lots of power. Their thrills come with contacting a new country once in a blue moon. My thrills were now coming with "every" QSO. A thrill a day. My interest in ham radio renewed itself.

But I knew trouble was brewing when my XYL caught me reading "The Joy of QRP". She told all her friends. It was embarrassing, but I didn't care. I had found a new niche, the perfect niche. The kids stopped yelling at me, they could watch TV again and actually hear their friends on the phone.

I put up more wire antennas and kept turning the power down and worked more and more stations. So I set myself a goal, to work all states with one watt. And I did it. Other milestones happened along the way, I worked New Zealand with one watt on 17 meters, I worked Texas on 20 meters with 10 milliwatts, that's 0000.010 watts as measured on my very special QRP Wattmeter.

Then I bought a real QRP rig, the HW-9. It's quite a radio with lots of parts on the boards. (It took a long time to build it.) It works really well. It drew too much current for the small solar panel alone so I now use it with a rechargeable gel cell connected to the solar panel.

It had to happen, I'm out of control. Every "real" QRP guy has a TEN-TEC. Now I have one (a Triton II). I even removed the power amp to make it a real QRP rig. I'm now trying for WQS QRP SSB, but all the DX keeps getting in the way. Bands are good. The big guns get five-nines plus a million, and I get five-eight's. They hear me, unbelievable!

The Manassas hamfest did me in. I came back with another SSB QRP rig (FT-7 Yaesu) and a beautiful HW-8. The MARC QRP Field Day effort will be the end of me for sure. I hate FD, but I love QRP. This should be really interesting. But my XYL keeps reminding me that my idea of roughing it is staying in a Ramada Inn, I'll let you know if I survive it. □

Source: QRP Quarterly
Article by: Richard W. Hayman, K3DML

Ham Radio Sold To CQ...

Skip Tenney, WINLB, Publisher of Ham Radio Magazine and Dick Ross, K2MGA, Publisher of CQ Magazine, announced at Dayton that CQ Communications, Inc. has purchased Ham Radio Magazine, the Ham Radio Bookstore and the title Ham Radio Horizons. CQ Communications, Inc. is the publisher of four monthly magazines including CQ, and two annuals.

Existing subscriptions to Ham Radio will be serviced on an issue-for-issue basis with CQ. Subscribers to Ham Radio who already subscribe to CQ will be given the option of extending their CQ subscriptions or fulfilling the outstanding balance of their Ham Radio subscription with any of the other current CQ Communications' titles, also on an issue-for-issue basis.

Staying on with CQ Communications, Inc. will be Craig Clark, NXIG and Terry Northup, KAISTC. Clark will be involved in a number of different areas at both a corporate level and with the development of the Bookstore operation. Northup will continue as a book editor and with the development of a series of high- tech quarterlies in the Amateur Radio field.

Plans for the Bookstore include publishing and distributing a wide range of titles appropriate to the interests of each of the four CQ Communications' magazines: CQ, Popular Communications, Modern Electronics, and the newly-acquired Electronic Servicing and Technology (ES&T).

Skip Tenney plans to devote full time to his computer consulting business for both small businesses and the banking industry. He can be reached at (603) 654-9584. □

The AMIGA CORNER

by **Ben Williams, AA7AS**
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The Amiga AVT System

Last issue I briefly mentioned the Amiga AVT system. Here, we are going to examine it in some depth, explaining many of it's more interesting features.

The AVT system consists of a hardware unit and support software. The hardware unit plugs into the Amiga's parallel port using a supplied shielded cable. Power for the unit is obtained via a "Wall-Wart" transformer, so there is no extra load on the computer.

In addition to the unit, software disk, and manual, AEA also provides cables and cable ends you can use to wire up the system.

The box has five independent receiver inputs, where various radios and tape recorders can be attached. There are two transmit outputs, and one PTT line which can be set for (+) or (-) keying via an internal jumper. In addition to these connections, there is also a standard RJ-11 telephone jack, which may be used to send SSTV or G1 FAX over the phone lines. The box is metal, and the entire system is FCC approved for both RFI and Telephone use.

There are no controls on the hardware at all; i/o selection and output level control are selected from either the control program's window, macros or scripts. This means that the hardware can be placed out of the way and ignored once it has been installed.

During transmit, the Amiga generates the audio AFSK signal and this is passed to the hardware via an RCA cable. The Amiga has four audio channels, and the software allows you to choose which channel is to be used by selecting a button in a configuration window.

The AVT system can run fifty five different SSTV modes. These are grouped into the following categories: 4 modes of "standard" B&W; 3 modes of WA7WOD line sequential color (25.5, 51, 102); 3 modes of European line sequential Volker-Wrasse color; 4 modes of Robot color composite; 4 modes of Robot B&W; 2 modes of asynchronous "Martin" color (M1, M2); 2 modes of asynchronous "Scotty" color (S1, S2); 2 modes of synchronous "Martin" color (M1, M2); 2 modes of synchronous "Scotty" color (S1, S2); 4 modes of AVT color; 1 mode of AVT B&W; 4 modes of European B&W; 4 modes of 50 hz European B&W; 3 modes of European 50 hz line sequential WA7WOD color; 1 mode of pseudo-visitel (5 second) B&W; 4 modes of synchronous Robot composite color; 4 modes of narrow bandwidth AVT color; 4 modes of QRM-resistant AVT color; 4 modes of QRM-resistant, narrow bandwidth AVT color; and lastly, 1 mode of qrm resistant AVT B&W. With the stick AVT system, SSTV images are received and transmitted in 262,144 colors, and displayed in 4,096 colors, in resolutions up to 320 pixels by 400 lines.

In addition to the SSTV modes, the AVT also runs nine different FAX modes. These are grouped into 3 speeds of 60 lpm, 120 lpm and 240 lpm, each in 3 different receive lengths of 400, 800, and 1200 lines. With the stock AVT system, FAX images are received in 16 gray levels at a resolution of 1024 pixels by 1200 lines.

You may have picked up on the reference to a "stock" AVT system; Black Belt Systems is about to release a $300.00 (retail) color adaptor that works with any Amiga that provides 256 gray levels and 262,144 simultaneous colors on the standard monitor. This works extremely well with the AVT system, showing the SSTV images in highly detailed color and the FAX images in 256 gray levels. The new device is called the "HAM-E" (For Hold-And-Modify-Extender). Call Black Belt Systems toll- free for details during mountain time business hours at (800) TK-AMIGA.

The AVT hardware is designed to demodulate AFSK audio signals. This presents a problem with geostationary and polar orbiting satellites, as these craft use AM modulation on their FAX signals. The same problem plagues simple FAX systems such as those in the AEA, Kantronics, and MFJ multimode TNCs. Overview systems in Sunrise, Florida has a terrific solution for this - they sell a board that converts AM fax to FM fax. It was specifically designed to work with the AVT system, but also functions well with any other FM (AFSK) FAX system. See the sidebar at the end of this article for details on this useful board.

Operating in its FAX mode, the AVT offers the capability to save and load FAX images, rotate them in 90 degree steps, flip them horizontally or vertically, complement the gray levels (make a negative image), and threshold the image. This last operation converts the image into a pure black and white image, a function that is very useful when receiving weather maps and other line-art types of images. FAX images may be "Pseudo-Colored", that is, one, some or all of the gray levels may be replaced with colors, which serves to highlight features in the image. FAX images may also be converted into SSTV images, so it's possible to run off to a satellite receiver, pull in the current image, and then send it on 20 meters to all your friends. You can zoom in on FAX images and pan all around them at very high speed. at the 1024x1200 resolution of the system, images are extremely detailed - all text on maps can be read easily and on satellite images, all lines delineating the state and country boarders are clear and distinct. You can create your own FAX images using a digitizer or any Amiga paint program. The AVT system can "grab" FAX images from any 640x400 screen displayed by any program. This allows you to easily make custom CQ and QRZ type screens, as well as show images of your shack and so on.

When operating other software concurrently with the AVT software (concurrently) the AVT offers the ability to inform you on exactly how much memory is available in the system before you initiate other programs. This handy feature keeps you "on top" of memory management in your system.

Operating in it's SSTV mode, the system provides such a wealth of features that even though they are each easy to use taken individually, learning all about the system can take quite some time. There are literally hundreds of buttons (also known as gadgets) that when pressed, perform some useful function. Add this to the multiplicity of SSTV modes available to use, and you have quite the complex situation.

To make this easier, the AVT uses on-screen buttons and menus almost exclusively to control it's operations. Individual buttons select each SSTV mode, and you can even put the system into "Automatic" mode, where it listens to the incoming signals and automatically switches into the correct mode at the beginning of each transmission.

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AEA's Amiga Video Terminal (AVT) Master SSTV and FAX System

Imagine sending and receiving high resolution color or black and white images and photos via radio transceiver OR telephone. And then imagine the ability to "erase" QRM and noise effects. With AEA's new AVT (Amiga Video Terminal) Master System, you get pixel perfect pictures. The AVT Master offers 55 SSTV (Slow-Scan TV) modes, many in up to 4,096 simultaneous colors with a resolution from 128 by 120 up to 640 by 400. Nine FAX modes in resolutions up to 1,024 pixels by 1,200 lines in 16 grey levels are also possible. The AVT offers every known SSTV commercial and experimental mode, as well as WEFAX, NEWSFAX and GEOS FAX (with optional board). This is a major breakthrough for SSTV and FAX enthusiasts!

Flexible Hardware. Five separate receiver inputs allow you to attach a two-meter, six-meter, HF and SWL rigs plus a tape recorder...all at the same time! Plus there's an RJ-11 telephone jack. Simply plug in your phone line to the interface unit and transmit a full-color image in about 12 seconds. Both positive and negative transmitter keying, as well as individual tape recorder and transmitter audio outputs provide the ultimate connection. You don't ever need to touch the box...all controls, including system audio output levels and input selection are accomplished on-screen using the Amiga mouse.

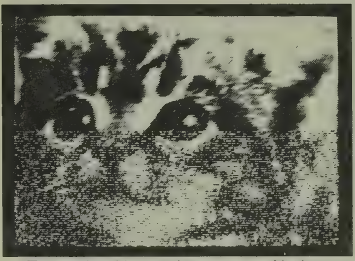
High Performance. The AVT is already in use every day, passing high quality images across the continental U.S. and from Florida to Hawaii. Images sent with the AVT may be damaged as much as 50 percent by QRM and QRN, and still be recovered by the system so that it's almost impossible to tell there was ever any interference. Built-in image processing and signal conditioning ensures the best picture quality, picture after picture.

Compatibility. You can receive ANY known SSTV or HF FAX signal...the AVT supports all modes, including the new European modes to the older color composites to black-and-white SSTV to 60/120/240 LPM FAX transmissions. Multiple aspect ratios provide the right picture when monitoring those unusual FAX stations, too. All of these modes are available in full transceive. The images received by the system are compatible with every paint program, digitizer, frame grabber and scanner currently available for the Commodore Amiga, allowing unparalled flexibility and artistic freedom.

Revolutionary. The AVT also offers new SSTV formats that easily outperform ALL pre-existing modes...integral data recovery, narrow bandwidth, full color, multi-image (3-D) with LCD goggles-not provided, multiple resolution and synchronous transmission.

AVT image received.

Intuitive. Every command is presented in a logical, consistent series of menus and control panels. Sophisticated tools such as a detailed oscilloscope simulator aids tuning. The system even transmits an "Alignment Signal" to ensure a quick match in frequency between systems when operating SSB. When you have a question, a 140-page comprehensive manual will provide you with the answer. Should you need further assistance, AEA's staff of trained technical support personnel can be contacted at (206)775-7373.



Transmitted image in process of being restored after heavy QRM.

Feature-Packed. Built-in capabilities include: Tuning oscilloscope. Mode-to-mode conversions. Interpolating zoom. Image inset. Brush "Clipart" (file artwork) cut and paste, including transparent background. Image tinting, brightness and contrast control. Thresholding. Black-and-white and color histograms. Text overlay using multiple fonts, boldface, italics and underlining in any combination or color. Automatic CW and synthesized speech ID after transmit. Extensive macro and script capability (with ARexx program). Custom color bar generation. Luma conversion and image averaging. Black-and-white and color negatives. Eight function damaged scan line "Repair Kit." Multiple mode full- frame intelligent image cleanup with sensitivity control. Owner defined FAX demodulation curves. Image rotation and flipping. Paint capability. Extensive ARexx language support. Real-time software filtering for scope and receive operations. Up to 16 high-resolution image memories at one time. Grab screens to transmit from any digitizer or operating program in real-time. Transmit and receive sequences of images using multiple memories. One button automatic reception of most SSTV modes. Automatic start and run at any time...catch those midnight FAXes without being there. Copy and exchange between image memories. On-screen DTMF pad. Image printing in both black-and-white and color on literally hundreds of different printers. You can even tell the system what to do remotely (with ARexx program), via packet and/or RTTY using standard TNC's such as AEA's high performance PK-232MBX multi-mode data controller.

Updates. Since the AVT is a software driven system, there aren't any costly ROM and hardware updates. Occasional updates will be provided on a disk. Simple, inexpensive and fast.

Inexpensive. The good news is that you can purchase the AVT and an Amiga computer system for less than a popular new SSTV system costs! If you already own the computer (minimum of one and one-half megabytes of memory recommended), the AVT suggested amateur net price through AEA's authorized dealers is only $299.95. For further information, contact your local AEA dealer or AEA corporate headquarters at (206)775-7373, P.O. Box 2160, Lynnwood, WA 98036.

Specifications subject to change without notice or obligation. Dealer inquiries invited. Copyright 1990.

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Certain features are completely unique to the AVT system. For instance, the AVT can send narrow-bandwidth SSTV images that are only 400 Hz wide. You can turn on your CW filter, and use an IF Shift type of function to move the filters active region to the 1700-2100 Hz area. This literally turns your transceiver into an optimized SSTV transceiver, with the obvious benefits that the AGC in the receiver only responds to the SSTV signal instead of wideband QRM, impulse noise energy such as lightning and splatter signals have less effect because of the narrow passband, and more signals can be packed into the same amount of radio spectrum.

A new technique in image transmission, called QRM mode, takes advantage of a geometrical/temporal relationship in the SSTV signal. The AVT can send all the even lines first, followed by the odd lines. Since any image consists of 1/2 even and 1/2 odd lines, it follows that the first odd line won't be transmitted until 1/2 the frame time is over. This means that any scan line that is adjacent to another scan line in the image is removed by 1/2 the frame duration in time. If you get a burst of interference, even a several second burst that destroys numerous received lines one after the other, the system will still have the other lines from the other field. These can be used to reconstruct the lost scan lines to an amazing extent - in fact, once the image has been reconstructed, you usually cannot tell that the damage occurred!

To recap, this technique doesn't (1) require any extra transmission time, (2) require any extra bandwidth, and does provide a huge immunity to QRM and QRN of any type with durations of up to 1/2 the total frame time at any point in the image. Since AVT modes are fully synchronous, scan lines that are lost due to noise have no effect on the overall registration of the received image. Combining the narrow bandwidth, QRM mode, and the synchronous data transmission you get the highest performance SSTV modes ever created.

The AVT offers post-receive image processing features that use a combination of area-averaging and data thresholding to clean up individual noise spots on an image. You can process the entire image, or just a selected area of it. These techniques are also very effective, and reduce noise spots while affecting the actual image very little or not at all. You can use the line correction features to re- create individual scan lines in an image by moving a cursor to the line of interest, then selecting copy from above, copy from below, or synthesize line options.

The copy options do just what it sounds like. They replace the line the cursor is on with a copy of the line above or below. The synthesize option actually creates a new line by making new pixels in every position in the line of interest which are the average of the pixels above and below it. This technique allows you to selectively repair line oriented severe damage in any SSTV mode. When operating line-sequential SSTV modes, a problem can occur called "out of color sync". This occurs when lines that are supposed to be in the sequence R-G-B R-G-B R-G-B sustain interference such that one of these lines is lost... when this happens, the next line after the lost line is taken as the previous line, and the sequence is wrong... R-G-B R-x-G B-R-G B-R-G B-R-G and so on.

The AVT software has provision for you to move a cursor to the line where the data was damaged, and "rotate" the data through the buffers until it is back in the correct sequence. This can be done multiple times in an image that has sustained multiple color sequence problems until they are all cleared up. Then the scan line repair kit can be used to replace the damaged lines with the synthesize function, and you can have a completely fixed image.

Another type of problem that is often seen occurs in frame sequential images. Here, the red frame is sent first, then green, and then blue. If a scan line is missed in these modes, then the frame that missed the scan line will be positioned one line too high from the point where the error occurred. This can be fixed by moving a cursor to the line where the problem occurred, and causing the frame (R G or B) to move down from that position only. Again, this can be done multiple times and in any combination of the three frames.

The AVT also provides some functions that allow you to manipulate the image as a whole. You can adjust the brightness, the contrast, and the tint of a color image. You can convert color images to luma (black and white) images, and you can analyze them with histogram and color counting features. You can create color and B&W negatives, and zoom any portion of an image up so that it fills the screen. You can also convert any SSTV mode into any other SSTV so that you can retransmit images to those with older scan converters that cannot "see" the newer modes.

You can have from one to sixteen individual image memories, and you can use these as round-robin kinds of transmit or receive buffers. Memories are selected by simply pressing the button with the memory number on it. The sequence of memories to be used is selected in a sequence-control window, where you pick the start and end buffer numbers. Memories can be copied to each other to "backup" images, and they may be exchanged with each other so as to control the order of presentation.

When operating SSTV and FAX, one thing you run into very soon is a shortage of space to put all these images. A 320x400 image with 18 bits per pixel takes 288,000 bytes in packed format. In unpacked, that is 6 bits/byte, takes 384,000 bytes, or 384k. Although the system does send all 18 bits and receives them as well, a stock Amiga cannot display these - it only has 12 bits. The AVT offers data compression when saving the images, such that they are not only compressed, but they are also reduced to 12 bits from 18 before compression. This reduces image files typically to the 50k byte range, depending on the data. Of course, when the HAM-E display device becomes available, these saved images no longer contain the higher level of color detail. For FAX operation, the same capability is available. FAX images that normally take up 614,400 bytes are reduced to the general size of 400k or less. Using the Amiga's 880k disks, you can get one fax image and approximately 10-20 high resolution SSTV images on each floppy. If you have a hard drive, then you can store many more, of course.

The system also provides a sophisticated oscilloscope simulation, where you can view incoming SSTV signals as waveforms. The 'scope has trigger control and automatically selected (by the SSTV mode choice) sweep rates. It becomes a trivial matter to see if you are tuned correctly to the SSTV or FAX signal you are working on. Working in conjunction with the oscilloscope is an "Alignment tone generator" which sends a distinctive signal that can be used by other stations to tune exactly to your operating frequency. These two tools taken together represent the end of off-frequency tinted and shaded images.

You can "cut out" arbitrary sized sections of any image and use it as a paste-down brush; if you create imagery in a paint program with a black background, you can optionally paste that brush down without the black portions - this allows you to create an elegantly styled callsign or logo that you can overlay on any image at the location of your choice without the requirement of a rectangular box around it. These brushes can be saved and reloaded, so you can build quite a library of things to "pretty-up" images before transmission.

The Amiga has a built-in font system which allows the user to have literally hundreds of fonts resident in the computer. The AVT allows you to use these to write on the images in any text style, using italics, boldface, and underline in any combination and any color. You can even use "sweeps" of colors from one side of the text to the other, your choice of the two colors used to generate the range that is swept.

You can generate reference color bars in each color mode that can be used as test signals or as backgrounds for your CQ's and so on. You can also place short color bars and gray scales at the top or the bottom of any image. The short color bars can be saved as "custom" color bars, for instance with your call sign embedded in them, or a reclining member of the opposite sex in a bathing suit.

One obvious question to ask when we're talking about an image transfer system is where does one get pictures of ones won to transmit? The AVT can take any image from any paint program made for the Amiga and use it for transmit. It can also "grab" a screen from any other running application such as a game, a spreadsheet, or a paint program live while the program is running to be used as image material. It also works with all twelve digitizers, frame grabbers, and scanners available for the Amiga computer. You can use images you get off of bulletin boards, from friends, or off of PD or magazine disks. You can have a friend with a digitizer take shots of you and your family and/or pets and use "clips" of these to build really sharp images in paint programs. You can use 3-d rendering packages to build complex simulated images of anything you can think of to transmit.

Something that has been tried for years with SSTV is the transmission of 3 dimensional images using red-green 3-d glasses. Until the AVT came out, it was mostly unsuccessful, and even when it did work, the images looked like... well, they were red and green... yech! The AVT allows you to send full-color, sharp, highly extruded 3-d images. It does this using the Haitex(tm) LCD-shutter glasses. These glasses are actually liquid crystal shutters, one for each eye. You plug them into the Amiga's secondary mouse port, and each time a new video field is displayed on the monitor (60 Hz scan rate) the glasses open one shutter and close the other. The AVT shows you one image on odd fields and the other on even fields - in this manner, each eye sees an image that the other eye cannot, and it's in full color, too! The AVT can show you a complete 200 scan line image in full color 3-d... they look great!

When an amateur station is on the air, it is required to ID every ten minutes. The AVT makes this totally automatic, and offers you the option to ID using CW or computer-synthesized speech. The contents of the ID are completely up to you - you can simply have "DE AA7AS" in CW or speech, or you can have "This is ARS AA7AS in Glasgow, Montana". You have control over the characteristics of the synthesized speech, you can set the speed, pitch, volume, and sex of the voice independently. If you don't want the ID to run after every transmission, you can turn it off and initiate it manually at any time.

The RJ-11 telephone jack can be used to connect to other Amiga owners, even non-hams using nothing but a telephone and two AVT systems. The system can auto-dial, auto answer, and more. You can even make it wait for a low-rate time, dial automatically, send the image, and hang up.

If all of this is not enough to keep you busy, try this on for size: The AVT system supports a complete script and macro facility. You can write up (in English, pretty much) scripts of commands and functions for the system to complete automatically. Users have already written scripts where they leave the system running all day, saving only selected types of images to disk so that when they come home, they have a whole library of SSTV pictures that went back and forth during the day! This macro facility also lets external programs control the system, allowing things like complete remote operation via packet and so on. This is done via the sophisticated ARexx interface. ARexx is an inter-process communications language, with loop control, floating point, and much more. ARexx is supported by most serious application software on the Amiga, and will be included standard with the 2.0 release of the DOS, due this summer sometime according to Commodore, the makers of the Amiga.

The AVT system is an "open" system. by this I mean that you, the user, can "get at" the internal image buffers. With just a few simple commands, the AVT will pass out the addresses of it's RGB buffers and the X:Y dimensions of the current image. You can then do "things" to the image, and when you are done, tell the AVT to redisplay the image. What would one use this for?

Well, the AVT has no edge enhancement routines in it (at present). So, if you wanted to have that capability and you were even a moderately competent programmer in C or assembler, you would just get the addresses of the RGB buffers from the AVT, process the data in there, and you're done. A command to do that would be about 25 lines of C code or so, and you can do anything, literally anything at all to these images using these techniques. You say you're not a programmer? Not to worry - there are a LOT of users out there who ARE programmers, and they have been busily writing things like this even as we speak. The current release disk has example software that shows you exactly how to process the buffers in this way, so there is no learning curve to get over for the programmer who wants to mess around.

The system comes with a 140 page manual complete with index, table of contents, and glossary. Frankly, it's neither long enough or detailed enough, and it could use quite a few more illustrations. AEA is working on a new manual and it should become available later this year. The manual contains brief descriptions of each of the SSTV modes, and a short history of them as well. It's very interesting reading for those new to SSTV and FAX. There are also explanations of the actual formats as far as the frequencies and

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so forth go, the VIS standard, TVRO reception of FAX signals, and a host of other items of peripheral interest to the SSTV/FAX operator. The software is not copy-protected, and may be stored on your hard drive without the inconvenience of key disks, manual hookups, or other difficult and potentially dangerous procedures.

In addition to the manual itself, the AVT comes with schematics and a parts placement diagram for the curious. All expensive ICs in the unit are socketed, and the system uses a double sided, solder masked PCB. Repairs, should they become necessary, are not all that hard to do. The system uses a 12 volt wall-wart, and generates +5 for the digital logic and -5 for the analog amplifiers and analog switch matrix. A 68705 Motorola microprocessor is used to provide the intelligence inside the AVT hardware, which handles the signal processing requirements and I/o switching. A very high gain limiter ensures that very low amplitude signals are demodulated correctly. All inputs and outputs are decoupled capacitively to reduce RFI, and the digital port (to the Amiga's parallel port) also has provisions for optional ferrite beads, should the user find that there is significant VHF interference at their site.

Program environmental requirements are 1.5 megabytes of memory, any model of Amiga computer. No other requirements. ARexx language is strongly suggested, as this will allow you to take advantage of the macro and script capabilities. ARexx lists for $49.95 in the US, and can often be found for as low as $32.50 at mail order software houses. It's worth every penny, too!

Updates to the latest version of the software are always available in data library 6 of the Amiga Vendor forum on Compuserve for the cost of the time it takes to download them. Often, you can download BETA versions of the software with strange new capabilities, and we take suggestions there for new features, too. We keep commands and scripts written for the system posted there too, so it's a really worthwhile place to visit now and again to see what's new with the system.

For European users in regions where PAL video Amigas are in use, a special version of the software is required. This is supplied with AVT units purchased in these countries. The PAL Amigas have a different system clock speed, and so the timers in the machine all need to be handled differently. Other than the fact that the version of the software is different, it is functionally the same at the user level.

Remember, this is not a review - I designed this system, and so am better versed in it's operation than a "normal" user might be. I'm also quite prejudiced "for" it, no big surprise, eh? I believe that this represents the premiere SSTV/FAX system available today on any computer, and I also feel that this is a good example of why the Amiga is a far superior system for the HAM operator to have around the HAM station. But don't just take it from me - get on 14.233 Mhz and ask the hundreds of AVT users you'll find there day and night! ☐

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Overview Systems of Sunrise, Florida has a unique board that may be used with any FAX receiving system including the AEA PK-232 and AVT, as well as the Kantronics and MFJ units. Any AFSK FAX demodulator including home-brew units can be enhanced with this board.

Its main job is to convert AM (Amplitude Modulated) FAX into AFSK (Audio Frequency Shift Keying) FM FAX, and it does this excellently. This is useful because the polar orbiting satellites on 137 Mhz and the Goes satellites on the Ghz bands all use AM modulation to transmit their FAX signals... an unassisted TNC is not capable of demodulating them, even though all the line rates and other characteristics are the same or similar to those of AFSK FAX signals.

If this was all the unit did, it would be enough to make it worth purchasing - but there is quite a bit more. There is also a control relay on the board that triggers whenever the board detects the 2400 hz carrier of an AM fax emission. This can be used to start a tape recorder such that it only runs when a satellite is broadcasting or is passing overhead, and it can be used to automatically stop a scanner from scanning - that is extremely useful for the 137 Mhz Polar orbiters, where there are several satellites, each on it's own frequency and each passing by at varying times as they orbit.

Normally, it is difficult to record a FAX signal on tape unless you have a special synchronous tape deck; the Overview board eliminates that problem by providing a special analog clock signal you can record on the opposite channel of a stereo tape deck. When you play the tape back, you simply run the clock channel back into the Overview board, and it uses this to lock up a phase lock loop which in turn generates a 2400 hz sync-locked clock to drive the FAX demodulator sync. The AVT system has a special jumper header where this signal can be connected; other units may or may not be able to take advantage of this feature.

I have no problem personally recommending this board; Overview systems and Tim Heffield, the designer, are reliable and produce a good quality product. The technical support is excellent, and many units are currently operating in the field. Units are shipped very shortly after orders are taken. Mine has never given me any trouble at all.

The Overview board comes assembled and tested, and costs $119.95

To enquire or order, write: Overview Systems P.O. Box 130014 Sunrise, Florida 33313

or call: Tim Heffield, N4IFP at (305) 748-8315 in the evenings.

NEW PRODUCTS

From KANTRONICS...

The DATA ENGINE: Offering extreme flexibility, with the capability for high speed and dual port operation. Dual modem disconnect headers can be configured for internal or external installation of many types of modems; the communications controller can support speeds in excess of 56 Kbaud. As shipped, the DATA ENGINE comes with an end-user 1200 baud modem. A whole family of modems under development. Suggested Amateur Net is $369.00.

The DE1200 Modem is designed for internal installation in the DATA ENGINE. The DE1200 may be installed as a second modem in the DATA ENGINE for dual-port operation. Also featured are three user selectable carrier detect circuits: sine wave, energy and external. Other capabilities include AX.25 compatibility, full-duplex and V.23 tones. Suggeted Amateur Net is $79.00.

Telemetry Unit with Weathernode EPROM. This product combines weatherwatching and packet radio. The Kantronics Telemetry Unit (KTU) with WEATHERNODE EPROM is a piece of data terminal equipment (DTE) that interconnects weather sensors to any brand TNC. The KTU is then programmed to sample the sensors at specified intervals. With the supplied temperature sensor installed, just connect and request the temperature, or request a number of readings from the last few hours. The KTU, with an optional anemometer (factory option), can also provide packet users with wind speeds and wind directions. Multi-connects are supported. Suggested Amateur Net is $110.00.

Packet PC Starter Pac. Great for packet newcomers. The STARTER PAC includes Kantronics PC-PACTERM program, an RS-232 ready cable, and two booklets: "Beginning Packet" by WD0EMR, and "MS-DOS Introduction for Packet Users" by KA5ZTX. Works with any TNC. Suggest Amateur Net is $25.00.

New Factory BBS News and Service Line. We've made a telco BBS available for product and service information and for the download of various amateur supplied sharewares. The board is available between 5pm (thru the night) until 8am, plus all weekends. The BBS number is (913) 842-4678. Check in anytime. You will be validated within two days after sign-on for specific service/product files.

For additional information on any of the above you may also contact Kantronics directly at: 1202 E. 23rd street, Lawrence, KS 66046 or call (913) 842-7745. □

From AEA...

New 2400 Baud Option for PK-232/MBX Data Controllers. The advantage 2400 baud is to speed up the data flow on overcrowded frequencies, especially in some highly concentrated packet cluster and DX spotting nets.

The 2400 baud option is based on an XR2123A PSK Modulator/Demodulator chip utilizing the CCITT standard V.26b. The remaining circuitry on the modem board supports the XR2123A, including a front-end high-pass filter.

Because the installation requires a great deal of exacting solder work, including trace cuts and direct soldering to IC pins, all installation will be made at AEA's technical support facility in Lynnwood, Washington.

All current warranty registered PK-232 and PK-232MBX owners should anticipate receiving a direct order form from AEA in mid-June 1990 to advise them of the new option. No advance orders will be accepted until the general mailing is made, to ensure that the fastest turn-around time for installation can be provided. Once the customer completes the order form and mails it to AEA, he/she will receive notification of his/her installation position, and when to send their PL-232/MBX to AEA.

Pricing: The 2400 baud option and instalation, including testing and calibration will be $130.00. For also adding the PakMail option at the same time, the total cost will be $200.00. (Note: The PakMail option must be installed in order for the 2400 baud option to take advantage of its full capabilities). Owners of PK-232 and PK-232MBX controllers who have not filed their warranty registrations and would like to receive information should write to: AEA, P.O. Box 2169, Lynnwood, WA 98036.

ET-1 ECONO-TUNER™. Meet your match, with this quality, economical all-band antenna tuner for under $150.00. Designed to match virtually any receiver, transmitter or transceiver from 1.8 to 30 MHz, the ET-1 handles up to 300 watts of RF power.

Additional features include:
- Compatible with almost ANY antenna that is fed by coax cable, balanced line or a single wire.
- A built-in 4:1 balun makes connection easy for balanced lines.
- A front panel switch control allows you to switch between two coax-fed antennas (direct or thru the tuner)
- BYPASS position allows you to switch to a dummy load (such as AEA's DL-1500) or a direct conected coax antenna. COAX 1 or COAX 2 can be selected so the tuner is bypassed, but not the meter circuit.
- Dual-movement meter to simultaneously monitor power and SWR.

Pricing: The AEA ET-1 is introductory priced at $129.95 amateur net thru June 30, 1990 at participating AEA dealers. $149.95 effective July 1, 1990.

DSP-1232 & DSP-2232 MULTI-MODE DATA CONTROLLERS. Utilizing the latest in DSP (digital signal processing) technology... the DSP-1232 (with two switchable ports) and the DSP-2232 (with two simultaneous ports).

All Modes.

The DSP has the hardware for all available digital modes built-in, now and forever, including the PASCAT, OSCAR 13 and OSCAR 15 satellite modems. Because all modems are stored in a DSP program, as new modems become available, the DSP-1232 and DSP-2232 only require a firmware module. Current plans are for the OSP to also will transmit and receive high resolution multi-level WEFAX and WEFAX APT images, as well as SSTV. It's also compatible with AEA's PK-90 2400 bit per second modem, HAPN's (Hamilton Area Packet Network) 4800 bit per second modem and K9NG, G3RUH's 9600 bit per second

(cont'd on page 31)

*by **Jim Mulvey, KS1A***

60 Serenity Dr., Tewksbury, MA 01876

ARIES-2: A User Review

So little time, so much hamming to be done! With your job, daily chores, obligations, appointments and family responsibilities to cover every day, do you get precious little time to ham? Then you're just like I am. There are so many bands and modes to be enjoyed! But, as much as we'd like it, we rarely get to kick back from the daily grind and put in a sizable chunk of on-air hamming each day. Subtract from that all the time that you spend on QSL maintenance and awards, logging and log maintenance, you don't have much time to key the transmitter. A lot of routine work in the shack can take up a lot of your productive on-air time. So what's a fellow to do? Add a good computer/hamming package to the shack!

The computer may just be the greatest addition to ham radio in the last thirty years. And WITH THE RIGHT SOFTWARE PACKAGE, you'll get all of that maintenance and logging stuff done in a faster, more productive way! The end result is that you'll actually spend a lot more time on the air, meeting new folks and working prefixes you haven't even heard of yet! And that's what it's all about!

Sure, I know bunky, you say that tinkering un-productively around in your paper log is as relaxing as being on the air. And, re-sorting your QSL's for the 8000th time for some award (this time in alphabetical, state, grid square, op's middle name order) is pleasurable. Maybe it is. But you're really just spinning your wheels. Think about it! You made THOSE contacts and now you could be making more, writing new pages of history!

The computer AND THE RIGHT SOFTWARE helps take away the drudgery of ham radio maintenance! If you don't agree it should be called "drudgery" I'll take another tact: the computer can do ANYTHING that you can do, only faster and better.

Take this simple digital quiz:

Can you tell me as of this moment:

1) How many stations have NOT answered your QSL cards? The computer can tell you with a couple of keystrokes. It can even fire off labels for you to put on a new batch of your QSLs to send out again.

2) What bands do you still need Peru on? If Peru comes up on 15 meters and only a few stations are trying for him, do you try and work him right away or spend time looking him up?

3) After a long contest with hundreds of contacts, do you have to manually crank out QSLs for all? With a keystroke the computer will print labels for you!

4) You're working G4FBJ right now...have you ever worked him before? The computer can tell you right away! And if you have spoken before you'll instantly know his name and info.

ASHTON ITC is marketing ARIES-2 for IBM PC/XT/AT/PS-2's and compatibles, a follow up to their wildly successful ARIES-1 ham radio software. I'd seen their ads in the various ham mags and always wondered why the name ARIES? Turns out it stands for Amateur Radio Integrated Entry System. With the introduction of ARIES-2, ASHTON ITC continues to not only market it's ARIES-1, it continues to nurture and improve it's younger brother. The advertising says that many people keep "ARIES" fired up in the shack all the time. In my case, that's exactly what I do.

Both programs (you only need one, depending upon your needs) are truly "Integrated Entry Systems". The logbook in both products feature fast data search and automatic entry of date and time from the computer clock. Frequency and mode are also automatically entered into the log when using a compatible transceiver. When using a mouse (you can also do this easily with the keyboard) you can enter data like Station ID, City, State/Country, Name, etc into the log from data received thru your terminal unit WITHOUT THE NEED TO RE- TYPE THE DATA! Using an optional mouse, you just move to the call sign and click. The log is instantly checked for any previous contact with this station! If a previous contact is found, the program fills in the name and other information from your last contact. So if I've ever worked you before I'll instantly call you Bruce and ask how your Ten-Tec rig is and how the new garage turned out that you were building the last time we spoke.

I completely reviewed ARIES-1 in Digital Digest July/August 1989. (If you didn't read it, no sweat! Just check that back issue. Or, drop Tom Arvo at Digital Digest a request for the article with a batch of freshly baked chocolate chip cookies. I don't know if you'll get the article.) Like Aries-1, Aries-2 lets you tie together the popular multi-mode TNC's and computer compatible transceivers with real time logging. In addition, ARIES-2 adds computer CONTROL of most rigs by Icom, Kenwood, Ten-Tec and Yaesu. This is very cool.

ARIES-2 has a terrific feature that digital DX'er will really like. It offers a timed log scan of the stations you have in the transceiver's memory, while recording the whole session in the computer's memory. That means you can program a bunch of RTTY frequencies into the transceiver memory channels. Then, you ask ARIES-2 to scan all those frequencies while you're at work and list everything that was typed out from your TNC!

Both programs offer simultaneous display of the TU's input/output on the same screen with access to the logbook! You don't have to change screens, it's all there in front of you. Nice. Makes reacting to the DX spotting net a pleasure! And as I've said in the review of ARIES-1, the programs make your TNC into a lean, mean fighting machine. Just about everything you'd need in any mode is accomplished with the Function keys. With ARIES, all of a sudden your TNC is super user friendly.

Both programs offer the printing of QSL labels. But the real beauty comes when you finish printing. The program asks you if it should update the log to say all those contacts have been sent QSL cards! You can update it any way you'd like. Both programs come with a very good contest mode that is fast and makes duping a breeze. Very fast contest exchanges are possible, especially in digital modes. A progressive contest number is assigned and simultaneously logged with date, time, freq, mode and contest exchange just by pressing three keys!

Another favorite feature of mine is the ability to run other software while staying resident in memory. There are two function keys assigned to "EXTERNAL PROGRAM 1" and "EXTERNAL PROGRAM 2". On my system, with the press of one key ARIES temporarily goes away and up comes the MFJ Gray-line map I've installed in the ARIES sub-directory. With the press of the second function key, up comes a wonderful public domain satellite tracking map! (neither are supplied with ARIES 1 or 2). You can install an MUF program, beam heading map, gray line program, etc. To get back to ARIES-2 I just press the escape key, and PRESTO!

A capture buffer allows you to selectively catch everything from your terminal unit and store it on disk. The buffer is scrollable!

Log maintenance is as easy as pie. You can search, sort, update and print your logs any way you'd like. Aries-2 supports log files limited in size only by your available disk space. Aries-1 is limited to approximately 1800 contacts per file.

You can upload and download files through Packet, RTTY and AMTOR. This lets you set up your own text files for airing (your equipment lineup, info about yourself, etc.). And, you can exchange programs over the air.

Both programs feature a scratch pad window to enter CW qso's, shell to DOS, easy re-configure of screen options like colors, manual and mouse entry of data, master control of TNC's (Aries-2 also contains a simple terminal program for odd TNC's), searching for any combination of station or prefix, name, city, state, date, time, frequency, mode, QSL data, and remarks (like 10-10 numbers).

Both programs include a nice printed user's guide. Programs are available on either 5 1/4 and 3 1/2 inch disks with your call sign burned in and run on IBM PC/XT/AT/PS-2's or compatibles with at least 256K of memory. For Aries-2 they suggest a minimum of 640K and a hard drive. A serial port is required for connection to a compatible Terminal unit or Transceiver. A second serial port is necessary if the user desires simultaneous interface to both units.

Both programs are full of very nice surprises that I can't even start to touch on. They're rugged and thorough. And, help and support are outstanding. There is nothing worse than buying a program (or downloading one) that you load all of your contacts into, only to start finding bugs that the author gives up on. ASHTON ITC fully supports their products with new updates at a token cost. (The company has been in business for years.)

If you're not interested in computer CONTROL of your rig, and you're log files are under 1800 each, go with the less expensive ARIES-1. Otherwise, ARIES-2 is the way to go.

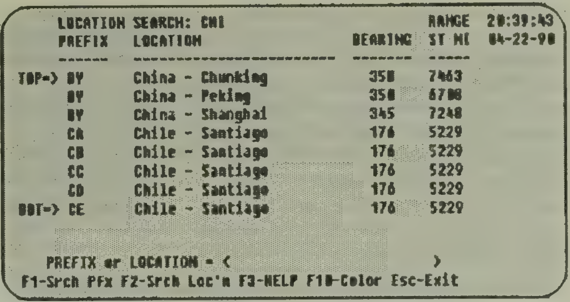
With new features being added all the time one wonders what could possibly be added? I can only think of two modules that ASHTON ITC could include next: 1) An award tracking system that looks at the main log data pool. 2) A label module that lets you interface ARIES with the Callbook on CD disk from Buckmaster Publishing. This way you'd not only automatically get a QSL label (as ARIES now does nicely), but also an address label to slap on the envelope!

Software like this can do all the routine drudgery and make your on-air time much more productive! I recommend the ARIES programs very highly. After a full year with the system, you'd have to fight me to get them out of my computer. Whatever software package you go with, and there are many out there, consider this: CHOOSE CAREFULLY! YOU ONLY WANT TO HAVE TO ENTER YOUR LOGS INTO A COMPUTER ONCE. IT CAN TAKE WEEKS AND WEEKS. Once it's in, you're in ham heaven. Choose a program that is supported and one that will grow! It would seem that ASHTON ITC will be around for many years to come.

Price is $89.95 for ARIES-2 and $64.95 for ARIES-1.

(For further details, contact ASHTON ITC, PO BOX 1067,
Vestal NY 13851; 607-748-9028) ☐

ASHTON ITC Offers New Bearing Software



```
    LOCATION SEARCH: CHI                          RANGE  20:39:43
    PREFIX   LOCATION                    BEARING  ST MI  04-22-90
    ------   -------------------------   -------  -----
TOP-> BY     China - Chunking              350    7463
      BY     China - Peking                350    6700
      BY     China - Shanghai              345    7248
      CA     Chile - Santiago              176    5229
      CB     Chile - Santiago              176    5229
      CC     Chile - Santiago              176    5229
      CD     Chile - Santiago              176    5229
BOT-> CE     Chile - Santiago              176    5229


   PREFIX or LOCATION = <                            >
 F1-Srch Pfx F2-Srch Loc'n F3-HELP F10-Color Esc-Exit
```

BEARING can serve as an excellent "stand-alone" program. Because it uses relatively little memory, it is also ideal for programs that have an External Program Interface such as ARIES-1 or ARIES-2. With the press of a function key you can search for a beam heading then quickly return to ARIES.

SEARCH BY PREFIX... To search on a prefix (or entire callsign), the user types the prefix and presses the enter key. You can also press Alt-P or F1 to initiate a prefix search.

SEARCH BY LOCATION... To search on a location, the user types the location and presses either F2 or Alt-L.

BEARING searches the database for a character-for-character match ignoring upper or lower case differences. THe master location database as supplied contains over 800 locations around the world and can be customized with just about any text editor with new prefix information or additional locations.

SYSTEM REQUIREMENTS: An IBM PC (or compatible) with MS-DOS or PC-DOS 2.1 or later. At least one floppy disk. Approximately 120KB of available memory after loading DOS and any other programs (ARIES for example). Optional are an attached printer and ASCII text editor such as KEDIT.

For more information on BEARING, and other available software products contact:

ASHTON ITC, P.O. Box 1067, Vestal, NY 13851
Phone (607) 748-9028.

Digital Digest

LANLINK
APPLICATION NOTES

*by **Joe Kasser**, G3ZCZ*
P.O. Box 3419 • Silver Spring, MD 20918

Working SAREX

Introduction

With the Space Shuttle Columbia (STS-35) about to blast off carrying the Shuttle Amateur Radio Experiment (SAREX) mission, this is a good time to start off a set of application notes on using LAN-LINK. Like any other computer software manual, the LAN-LINK manual tells you what the controls (menus and function keys) do, it does not tell you how to use LAN-LINK. These application notes are intended to do just that.

STS-35 is the most exciting event in packet radio this year. Unfortunately due to the primary astronomical payload misson constraints, the Space Shuttle will pass over the US, in the main, during darkness. At weekends staying up for a connect attempt may be fine, however during the week, that may be a problem. LAN-LINK 1.55 (and up) has features built in to it to allow you to make a connect with the orbiting SAREX Robot, while you are at the office, or even fast asleep.

Working SAREX

First thing to do, is to set your 2 meter transceiver to receive on 145.55 MHz and transmit 600 kHz lower on 144.95 MHz. Set your deviation low so that your signal is not Doppler shifted out of the SAREX receiver's passband. You can do this simply enough by asking someone to listen to your signal's audio, while you gradually reduce your transmitter audio gain.

The next thing you ought to do is to configure LAN-LINK to capture to disk any packets addressed to or from the SAREX callsign. You do this by bringing up the AMSAT-OSCAR Menu and chosing the SAREX submenu. A [S] will be displayed in the status window when this option is active. The capture-to-disk file is opened by a packet header containing the SAREX call, and closed by another packet header not containing the call. When the file is open, the [S] will blink. Packet headers are considered to be lines with a '>' character in them. LAN-LINK thus considers both of the lines below as packet headers.

```
N4QQ*>G3ZCZ N4QQ BBS>
```

If you use this feature for monitoring BBS traffic, the BBS prompt lines ('E.G. N4QQ BBS>') will not be captured to disk. Do not get your SYSOP to remove the '>' from the prompt line, or the ZAP feature will then not work.

A happy face will be displayed next to the 'S' in the [S] after the SAREX call has been heard.

Lastly, using the 'Terminal Menu', set the Terminal mode to 'Everything' to allow you to view all packets on 145.55 MHz.

Manual Connect Requests.

If you happen to be awake when the Shuttle comes into range, then try to connect to it manually. LAN-LINK has two ways of doing this.

Try using the Alt-C function key. When you activate the Alt-C key, LAN-LINK will prompt you for the call. Enter WA4SIR-1, and LAN-LINK will try to make the connection. If for some reason it fails, push the Alt-R key and it will retry.

If you have copied at least one packet from SAREX, then push the F5 key and move the cursor down and over to the SAREX callsign or WA4SIR-1. Place it on any character in the call and push the "Enter" key. LAN-LINK will then try to make the connection. If for some reason it fails, push the Alt-R key and it will retry.

Automatic Connect Requests

Bring up the AMSAT-OSCAR Menu and choose the SAREX option. First make sure that the SAREX Call is set to WA4SIR-1. Then turn the Attack Mode ON. When the Attack Mode is set, this option will cause LAN-LINK to issue a connect request to the SAREX Call whenever a packet sent to or from it is heard. The mode is cleared when the connect is made (and does not retry out) or when the 'A' option is selected a second time, or when the Alert Call is cleared. If this mode is enabled, the Alert/SAREX Call prefix shown in the Status Window will indicate accordingly.

About the Author...

Joe Kasser's, thoughts and comments on computers in Amateur Radio have been published in two books and numerous magazine articles. He is also the editor of the AMSAT Journal. He has a 20 year background in aerospace, amateur radio and the man-machine interface. He spent the last three years writing LAN-LINK to both simplify the user's interface to packet radio, as well as to provide the user with a smart terminal. LAN-LINK is not a TNC controller program or a mail box. LAN-LINK provides each user with a window into the LAN. LAN-LINK is menu driven so that each user can dive as deep as necessary into the program's features. This series of application notes, shows you, the operator, how you can smarten up your use of packet radio and other digital communications by using smart software in your PC.

A happy face will be displayed next to the '>' before the call in the Status window once the connect has been achieved.

The Periodic Event Way.

If you have a set of Keplerian elements, and know when the SAREX will be in your range, you can set LAN-LINK to start issuing a blind connect request to WA4SIR-1 just before the Acquisition of Signal time, at periodic intervals through the pass, and to stop just after Loss of Signal time.

Bring up the Event menu, and select the Periodic Event option. Enter the the start time, the finish time and the time interval between the connect/call attempts. The first connect that goes through will clear the event scheduler.

If you really want to make a connect withe the SAREX, one of these LAN-LINK features ought to let you.

I strongly suggest that you test the automatic features before you sleep on it, just to be sure. From the SAREX menu, change the SAREX call from WA4SIR-1 to that of your local Net Rom, The Link or KA Node. DO NOT set it to a BBS call.

(cont'd on page 25)

(cont'd from page 11)

and ham equipment. Some how, it has become the place, each spring, where the industry and hobby leaders meet to transact all sorts of business deals.

The insiders, many of whom are competitors, spend a lot of time finding out what others are doing. Further, they expend a lot of effort making arrangements with others to improve their products and support. From a marketing standpoint, it is good business to be there. Many vendors count on the sales at Dayton, but to not be there and not be seen and visible, could start a lot of nasty rumors.

Also observed, were many groups of well dressed businessmen, probably from Japan, taking lots of photos and video. Not much seemed to escape the watchful eyes of these groups, who usually wore neither badges or caps with callsigns. Apparently, they realize that the best and latest is represented and know the value of paying attention.

More than most hams ever dreamed, Dayton is an insider's game. The 30,000 hams in attendance, just happened to be there and were incidental to the real action affecting the future of the hobby.

TEASER OF THE MONTH . . .

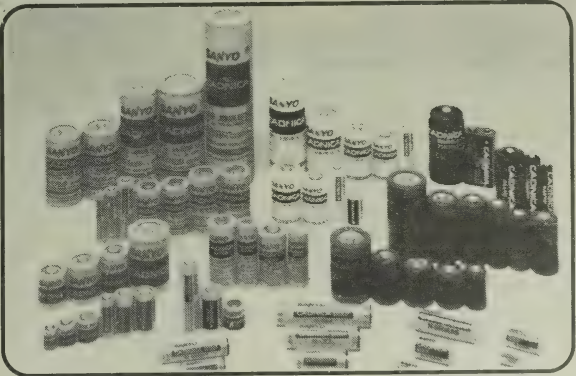
Have you ever given any thought to the RF energy that is all- round your body? Once I built a digital clock for my shack. The clock worked beautifully until I keyed the transmitter.

Then the digits whirred and spun as the RF was emanated, making me believe I had lots of poor coaxial connections and poor grounding. Not so. I checked and tested and found all to be the best I could do. It just happened, the clock was not shielded, but it did serve to tell me that I was in an environment with lots of radio frequency energy.

When you operate, even if it is a two meter handheld where the antenna is near your body, stop and think. Take all the precautions you can to have your equipment grounded and shielded. To use ham radio means to use radio frequency energy and it cannot be avoided, but let's try not to fry ourselves in the process.

DISCLAIMER . . .

In spite of all the comments you have read that are intended to poke a little fun at us as a group, Radio Amateurs world wide are really a very special group. We share a hobby that is both highly technical and requires a lot of expertise, and that is also very personal by it's nature. We talk to each other. That is good for the world as a whole and particularly good for us as individuals. We create good feelings when many times governments have been at odds. Do all you can to promote such a worthy pastime. ☐



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Digital Digest

SOFTWARE

by **Mike Bryce, WB8VGE**

2225 Mayflower NW, Massillon, OH 44646

LOGic Logging Program

Impressive! That was the first thing that popped in my mind when I booted up this month's review; LOGic by Personal Database Applications.

I tested LOGic out on a generic 286 IBM clone machine. The machine had a 20 meg hard drive installed. You'll need the hard drive to run this program. Anything less will be a waste of time. A CGA monitor was used as was 640K of RAM.

The program comes in several disks. The disks are copied onto the hard drive in a directory I called LOGic.

I had a little bit of a time getting everything installed on the drive. A auto install program would have really been nice to have. Could have eased my temper a few times.

After you have installed and have LOGic running, you're greeted by the main menu. This is the entry way into the many features of the program.

From the main menu, all commands can be selected by hitting the first letter of the command you want. You may also enter just the number of the command. I feel much smoother operation can be had by using only the letters for commands.

LOGic contains a very good help file. This can be brought up at anytime by pressing the F1 key. This help file is available through out the program. While not the manual, there is enough information on the screen to get you out of most problems.

LOGic provides some of the best screen and field editing I've seen in a long time. For example. You have your choice of either overtype or insert modes when adding QSO information to the fields. While speaking of fields, the program defaults to only valid modes. This way when you run the report function, you won't miss a QSO if you typed in RTY instead of RTTY. Some people are now using BAUDOT instead of RTTY. To a human, it's all the same. To the computer, it's all different.

While not really my cup of tea, LOGic will support and talk to the computer controller radios. This will allow direct control of all of their functions as well as real time logging. Real time logging is made much easier cause LOGic will automatically give a UTC offset for logging. All you have to do is tell LOGic the amount of offset and it's done.

LOGic has two different but similar logging screens. One for what I call "rag chew" and the other for faster contest logging with automatic serial number and duping functions. Pick the one that best suits your needs.

LOGic has what they call "action fields." I like to think of them as a mini menu. To input data to the screen you call up the ADD function at the action field. When the ADD function is active, the fields are highlighted and you can then start to add data to them. Most of the inputs are common sense. You of course input the station's call in the CALL field. When you enter a call, and provided the auto DX and direction has been turned on, the long and short path bearing will be shown. A nice feature, but does slow down the add function a bit.

One of the first things I found I did not like about LOGic was all those fields for names and address. When working a lot of stations, as you would in a special event, you have to keep hitting the return to get through all those fields. LOGic can be told to turn off the address fields, but you can't send QSL then.

LOGic has some of the best features when inputting data. If you can't remember what the two letter postal abbreviation for a state is, press F1 for a list..

LOGic won't let you input a invalid RST either. And if you're like me , I just hate having to input that extra "9" when the report is 599 and you're working CW. LOGic will do that all for you! The rest of the fields are very simple to understand. Band, Mode and Time fields. After you've entered the required data, you're free to edit and change to your heart delight. When you're all happy with the results, you SAVE the QSO.

When working real time logging with a computer controller transceiver, most of the fields will be already filled in by the radio. All you have to do is enter the call and report. Since my QRP transceiver is a bit on the old side, I could not test out this feature.

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If you would like to retrieve a QSO, you have to GET it from the action field. You GET a QSO by calling up the call sign of the station worked. After the field is displayed, you can edit or change the data to your liking. LOGic has a very powerful find feature. Find will let you look up just about anything you want. You can even find a particular QSO that has, let say, Macintosh SE PK-232 in a comment field! The find feature is really slick in LOGic. You can also define you own fields to find. A great help for Ten-Ten numbers, countries hunters and even QRP numbers.

The contest screen is a special version of LOGic. Faster and with a auto saving feature. Just in case the field day generator runs out of gas. You can check for dupes in the contest with LOGic. No need for any special contest software. LOGic will handle it all for you.

LOGic supports one of the best report, awards tracking features around. But because of the the complexity of generating reports, I don't have the space here to go into details. LOGic has a separate report writer manual in addition to the regular manual. The LOGic manual come pre-printed No need to tie up the printer generating operating manuals.

LOGic has so many features, that perhaps, it might be its biggest hang up. I found the learning curve to be very high. LOGic does so many things I found myself reaching for the manual time and time again. Some logging programs give you a few goodies, LOGic give you a lot. And then allows you to custom those goodies to suit your personal needs and likes. You can for example, turn off the auto field exit. This way when you input data to a field you need to hit the return key. Turning on the auto field will cause the next input field to become active.

QSLing is easy with LOGic. You can sort, print and automatically update the file for QSO sent or received. LOGic will produce QSL sticky labels for your QSL cards.

LOGic is a very powerful program. It will take some work to get all of the features running. The report generating feature is almost beyond words. If you ever had a need for a special report. LOGic can handle it.

LOGic requires a lot of disk space. The run time module must be placed some where in the current directory or in the root directory.

As I said in the beginning, a hard drive is a must.

So the bottom line? Well, in a word, IMPRESSIVE! If you're after a logging program that will do everything possible, LOGic would be it. If you don't want to worry about all of the features of LOGic, perhaps you should look at a simpler program to do your logging.☐

(cont'd from page 22)

The next time you see a packet from the Node, your station should try to connect to it and capture-to-disk to packets with the node's call in the header.

Don't forget to change it back to WA4SIR-1.

Afterthoughts

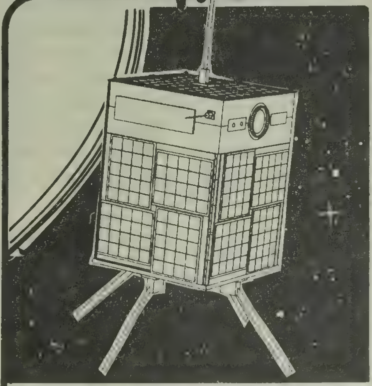
1. If you want to see an early version of what Ron will see as an ORBITER menu when he wants to control the SAREX Robot, temporarily change the SAREX call to be the same as your call and bring up the AMSAT-OSCAR Menu.

2. Send an edited summary of the contents of the real SAREX capture-to-disk file to SAREX @ W3IWI via packet, for a QSL card for a reception report. Just send copies of one or two packets containing all the calls.

3. You can also use this feature to try to connect to a DX- pedition running packet radio (such as the 4J6X DX-pedition in late May) while you are at work. How about that! Now your station can work those future rare DX stations, and you won't need to be 'sick' at all.

73 , Joe / G3ZCZ

LAN-LINK is available from the author. For an evaluation copy, download it from Compuserve or send $5.00, or send $35.00 for a registered copy which will entitle you to at least one free update. When you write in, say where you saw this Application Note.



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by **Jonathan L. Mayo, KR3T**
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An Introduction To The MS/PC-Dos World of Computing

This article introduces yet another new column in Digital Digest - IBM Arena. Over the past year, Digital Digest has been adapting almost continually each issue in an effort to deliver useful and up-to-date information on amateur radio digital communications. It is clear that microcomputers play a major role in most all digital communications stations, so Digital Digest is adapting once again by expanding its coverage of microcomputers.

In the previous issue of Digital Digest, two new computer specific columns were introduced: MacHam World and Amiga Corner - for the Macintosh and Amiga microcomputers, respectively. This column, IBM Arena, will cover microcomputers conforming to the IBM PC standard. We'll get into what precisely is the IBM PC standard a little later, but for now, you pretty well know if you have an IBM compatible computer.

When the original IBM-PC was first introduced back in 1981, the microcomputer market was just gaining acceptance with the general public. Before that time, microcomputers were regarded as hobbyist toys. Although the Apple II was introducing the power of microcomputers to schools and businesses, it was the IBM that "validated" the fledgling microcomputer industry.

Today, the IBM-PC is a firmly entrenched standard in the microcomputer world. I think its safe to say that there are more IBM-PC compatible computers in operation than any other type. And, while one type of microcomputer is much like another, there are very significant differences between them. I will continue to cover generic microcomputer applications in my Computers column, and I will cover IBM specific applications in this column.

Do I Have an IBM-PC?

In order to make use of the information contained in this column, you must be using an IBM-PC or compatible personal computer. If you're sure that your computer is an IBM-PC or compatible, you can skip this section. However, if you're not sure, this section will help you find out.

A sure sign that you have an IBM-PC compatible personal computer is the operating system that you are using. IBM-PCs use the MS-DOS and PC-DOS disk operating systems. This will guarantee that your computer can run most, if not all, of the software written for the IBM-PC. However, there are many personal computers in existence that can use the IBM-PC operating system but are not compatible on a hardware level with an IBM-PC.

A hardware level compatible IBM-PC will contain an Intel 8086, 8088, 80186, 80286, or 80386 microprocessor. There are a few microprocessors, such as the NEC V-20 and V-30, that are compatible with some of the Intel microprocessors. Most all IBM-PC compatibles also contain between three and ten expansion slots for add-on circuit boards.

If your personal computer uses PC-DOS or MS-DOS, has an Intel or compatible microprocessor, and has expansion slots, it's a good bet that it is compatible with the IBM-PC. You can be extra certain by running MS-DOS software such as Microsoft Flight Simulator. If you system passes all these tests, it's compatible enough with the IBM-PC to make use of the information in this column.

PC, XT, AT, or 386

Not only is it important to know that you have a IBM-PC compatible computer, but also where it fits in the line of IBM-PC personal computers. The first IBM-PC is known as the PC. It has a small power supply, limited memory expansion capability, no hard drive, and uses an Intel 8088 microprocessor. The PC/XT was an improvement on the PC. It has a larger power supply, more memory, a hard drive, and also contains the Intel 8088. The AT is a step up from the XT. The AT has an Intel 80286 microprocessor and includes CMOS RAM. The 386 refers to any personal computer based on the Intel 80386 microprocessor; in most all other respects, it is very similar to an AT.

The IBM-PCs Memory

The internal memory architecture used in personal computers differs from one model to another. Fortunately, all IBM-PC compatibles that are run under PC-DOS or MS-DOS have roughly the same internal memory architecture. Thus, the concepts discussed in this section will apply to all types of IBM-PC compatibles.

There are two types of physical memory: RAM and ROM. RAM stands for Random Access Memory, and ROM stands for Read Only Memory. The key difference between these types of memory is that RAM can be both written to and read from while ROM can only be read from once initially "burned in." RAM is the memory that programs and data are stored in and loses the information that is stored in it when the computer's power is turned off. ROM, as the definition implies, contains programs and data that do not change and retains the information stored in it even when the computer's power is turned off.

RAM

There are also several types of RAM. The most common is conventional memory. Conventional memory includes the first 640 Kilobytes, or K, of RAM. A kilobyte is 1024 bytes, and a byte is composed of eight bits. A single character is represented inside the computer by a unique combination of eight bits, or one byte. RAM above the conventional memory limit of 640K is either extended or expanded memory.

Extended memory is found only on IBM-PC using the Intel 80286 or higher microprocessors. For example, the 80286 can address up to 16 megabytes of RAM, the portion above 640K referred to as extended memory. On the other hand, expanded memory can be found on all types of IBM-PC compatibles.

Expanded memory is simply an extension of conventional memory, rather than a continuation as with extended memory. The computer thinks it has only conventional memory, but through clever switching techniques, banks of memory can be exchanged into conventional memory. This gives the ability to have megabytes of RAM on IBM-

PC compatibles that do not support extended memory.

Yet another type of RAM is CMOS. CMOS is a type of RAM that is battery backed so that it does not lose the information stored in it when the computer is turned off. It is usually found in IBM-PC compatibles with 80286 or higher microprocessors and is used to store configuration information about the computer system.

ROM

The main ROM contained in an IBM-PC compatible computer system is the ROM-BIOS. BIOS stands for Basic Input Output System and is part of the IBM-PC's operating system. The BIOS is responsible for handling the hardware input and output requests for the computer system. The remainder of the operating system is loaded into RAM and is stored on disk. Other ROM in the IBM-PC can be found on graphics cards and on hard drive controller cards. Unchanging programs necessary to use these cards are stored there.

Disk Drives

There are two main types of disk drives currently in use today: floppy disks and hard drives. Most IBM-PCs today have one or two floppies and a hard drive for on-line storage. In this section, we'll explore several aspects of both floppy and hard drives.

Floppy Disks

In the IBM-PC world of computing, floppy disks come in two sizes, 5-1/4 inch and 3-1/2 inch. Through a variety of storage techniques that are covered later, the 5-1/4 inch disks can store 160K, 180K, 320K, 360K, and 1,200K (1.2Mb) of information. The 3-1/2 inch disks can store either 720K or 1,440K (1.44Mb).

Physically, a floppy disk consists of a circular piece of plastic film that is coated with a magnetically sensitive iron-oxide coating. The circular film is enclosed within a protective jacket. The 5-1/4 inch disks have a flexible plastic jacket while the 3-1/2 inch disk have a rigid plastic jacket.

There is a read/write opening cut into the jacket so that the head of the disk drive can

(cont'd on page 29)

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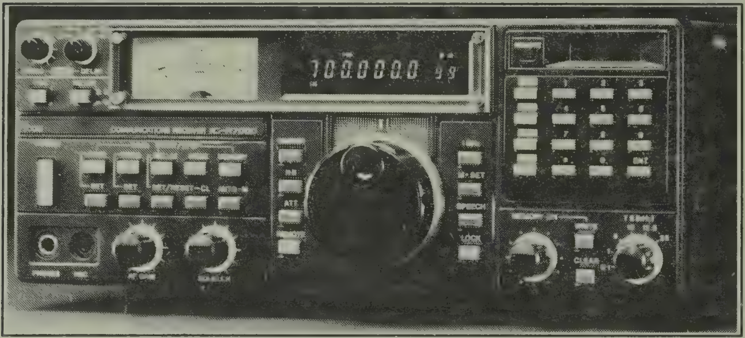
MacHam World

by **Stan Horzepa, WA1LOU**

75 Kreger Drive • Wolcott, CT 06716

Mac Control of the Icom R-7000 Receiver



Remote Controlled Scanning System (RCSS) is a hardware and software system that allows you to control an ICOM IC-R7000 receiver by means of the keyboard and mouse of a Macintosh computer. The hardware provides an interface between the Macintosh's serial port (either the printer or modem port) and the Recorder-Remote and Remote jacks of the IC-R7000. The software uses this interface to control the receiver.

When you run the program, the Macintosh displays the front panel of the IC-R7000 receiver. Click on the Power switch and the frequency that the computer displays matches the frequency of the receiver. Click on the Up and Down buttons on either side of the main tuning control and the frequency of the receiver goes up and down according to the increments selected with the Tuning Step Selector Control (instead of clicking on the Up and Down buttons, you can use the up and down arrows on the computer's keyboard to do the same thing). Click on the Tuning Step Selector Control and a dialog box is displayed to allow you to change the increment.

Using RCSS, the user may control most of the functions that are managed by the microprocessor contained within the receiver. As a result, many of the front panel controls of the IC-R7000 are acessible from the computer. From the computer, you can enter frequencies, select memory channels, and enable various modes of scanning that are supported by the receiver. You may enter frequencies by clicking on the receiver's keyboard that is displayed by the computer or enter them by typing directly on the computer's numeric key pad.

Expanded Control Capabilities

RCSS provides new functions that are not offerred by the receiver. Whereas, the receiver has 99 programmable memory channels, RCSS allows the user to access an unlimited number of frequencies in banks of 99 channels. These channel banks are contained in files stored on disk that may be loaded into the computer and uploaded into the receiver at will (it takes approximately one minute to load the receiver's 99 memory channels). The user may move frequencies, stored in the receiver, to memory or disk and back to the receiver. Once stored, these can be recalled at a later time.

The channel bank files may be accessed by the program to display and edit the contents of the each memory channel. The information contained in the channel bank files is extensive and includes the channel number, mode (AM, FM, SSB, etc.), frequency, number of "hits" (the number of times a signal was detected on the channel), number of times the channel was scanned, data and time of the last hit, the amount of time the channel was last active, type of service, type of unit, location, comments that are displayed when a signal is detected on channel during scanning, and private comments. If service names (for example, "ham radio") are included with each frequency stored in a bank file, the user may scan only those frequencies that are asssigned to a particular service.

Program Bust or Bug?

RCSS claims to be compatible with Macintosh computer models 128k, 512k, Plus, SE and II. Initially, I used a Macintosh SE to test the software and was satisfied with its performance. Later, I tried the software on a Macintosh IIci and ran into two minor, but annoying problems. On the SE, the frequency and memory channel readout as displayed on the Macintosh emulated the large LED frequency and memory channel displays of the IC-R7000. However, on the IIci, the frequency was displayed in a small plain font that was displayed on top of the simulated LED display that continuously displayed "8888888." The display of the memory channel also used a small plain font, but instead of displaying the memory channel number, it displayed one or two lower-case letters (a through ii).

I talked with Watts Hill, one of the designers of the program, and he said that either my program was corrupted or there was a bug in the program. Watts is sending me a fresh copy of the program in case the problem is due to corruption. He is also checking for a bug and, if one exists, the program will be fixed and updates will be made available to all who are affected by the bug.

RCSS is a good tool for expanding the capabilities of ICOM's excellent receiver. Despite the problems I encountered, I recommend it. Remote Controlled Scanning System (RCSS) is available for $189.95 from Systems & Software International, Ltd., 4639 Timber Ridge Dr., Dumfries, VA 22026, telephone 703-878-1460. The current version of the program is Version 1.1 (Version 1.0 owners may upgrade for free). A color version of the program is also available.

Mail to MacHam World may be delivered in any of the following ways:

via USPS: 75 Kreger Drive, Wolcott, CT 06716

via CompuServe: ID no. 70645,247

via packet radio:
WA1LOU@N1DCS.CT.NA.USA

via Internet: 70645,247@compuserve

(cont'd from page 27)

read and write to the iron-oxide coating. In 3-1/2 inch disks, the read/write opening is covered by a spring loaded shutter. In the center of the disk is the hub. The hub is where the disk drive's motor mechanism grasps the mylar film so that it can be rotated.

The final important detail about floppy disks is the write protect mechanism. The disk drive will not write to a disk that has its write protect mechanism activated. On 5-1/4 inch disks, the write protect mechanism consists of a small cutout on the side of the jacket. If the cutout is open, the disk is write enabled and the drive will be able to write information to the disk. To write protect the disk, the cutout is covered with a sticky, tape-like tab.

3-1/2 inch disk have a slightly different write protect mechanism. In one corner of the 3-1/2 inch disk's rigid jacket is a small square cutout with a built-in sliding tab. If the sliding tab is closed so that you cannot see through the cutout, the disk is write enabled. To write protect the disk, slide the tab so that the cutout is open. Note that on some 3-1/2 inch disks there are two square cutouts. One of the cutouts is the write protect mechanism and the other is used to indicate to the disk drive that the disk is a high density (1.44Mb) disk. The 720K 3-1/2 inch disks, obviously, have only one cutout.

A new disk, regardless of size, must be formatted before any information can be stored on it. During the formatting process, the surface(s) of the disk are organized into concentric tracks. Each track is also divided into sectors. A disk can have either one or two sides formatted; one formatted side is called single sided, and two formatted sides is called doubled sided. The number of tracks and sectors per track can also vary. The standard 360K diskette is double sided and has 40 tracks with 9 sectors per track. Each sector holds 512 bytes of information, so that's 4,608 bytes per track, 184,320 bytes per side, and 368,640 bytes per disk.

When the disk is formatted, certain control information is written to the disk. The very first sector of the disk is the Boot Sector. The boot sector is followed by the File Allocation Table (FAT). The boot sector contains information about the FAT and what format the disk is. Additionally, if the disk has been formatted as a boot disk (a disk that contains operating system files necessary to load DOS into the computer), the boot sector will include DOS information as well as the names of the system files stored on the disk.

The FAT is a record keeping area where DOS keeps track of where information is located on the disk. There is an entry in the FAT for each location on the disk that can store data. When information is written to the disk, the FAT is updated to reflect where the information is stored. Each entry indicates the next entry where more of the information is stored or if the current entry is the last entry. Because the FAT is vital to finding stored information on the disk, DOS usually maintains two copies. If one becomes corrupted, the other can be referenced.

(continued on page 32)

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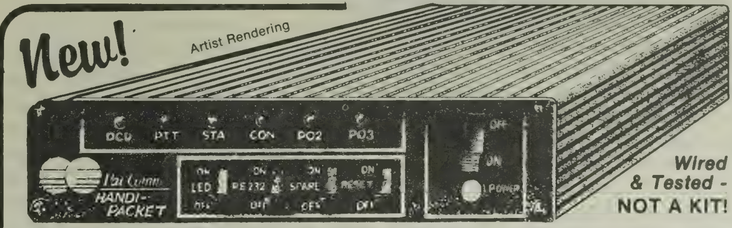

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Contesting & Packet Radio Spoting

Editor's Note: Due to circumstances beyond Jon Mayo's, KR3T's control, "Landline Telecommunications Part III" originally scheduled for this issue will appear in the July/August issue.

When the first microcomputers were introduced in the late 1970s, radio amateurs started thinking about how to use them in contesting. It took a while before home computers became powerful enough to do much more than dupping logs after the contest. Now they are used to do real time logging, duping and keeping track of statistics that allow the sharp contester to make better tactical decisions during the contest.

Throughout the 1980s, other hams experimented with linking computers by radio. This has evolved to the point where a contester can use a multicomputer network spread over several states to obtain the latest information on potential new multipliers. This technique is known as packet radio spotting.

Last fall's CQWW contests were my first exposure to using packet in a contest. The first thing I could say about it was that it made the contest a lot more fun. I figure 1 worked about 20 more multipliers on phone than I would have without packet. Packet did not provide quite that many extras on CW, though. For a number of reasons I limited my operation on both modes to 10 meters. Certainly an all-band effort would have resulted in many more extra multipliers.

In the northern Illinois and southern Wisconsin area we had about six packet 'clusters" during CQWW. Things got overloaded, and for a good part of the contests, the two states were disconnected. Still, over 100 stations logged into the packet spotting network, and an estimated 1000 DX spots were repored. Since then the network has expanded with several new nodes and new node-linking frequencies. At times there are over 80 stations logged in at once on non-contest weekends. The ARRL DX contests should be quite interesting.

Besides being more fun, packet also made it more complex, and at times distracting, Scot Herrick, NB9C, mentioned that packet spotting is really another tool. Learning to integrate the new tool into contesting effectively is another skill that a contester using it needs to learn.

Probably the biggest challenge in using packet spotting is deciding if you should leave your CQ frequency to try to work the new multiplier just announced. One thing that keeps you from leaving a reasonable productive CQ run is the unceraınty over whether there are any new multipliers out there. Packet eliminates the unceraınty. John Crovelli, W2GD, has a quick rule in deciding if he should leave a CQ frequency to work a statbon. If the CQ rate is over 60 per hour he stays. This seems reasonable. I found that when the rates were lower, say 30 to 40 an hour, I could often work the DX station without losing my CQ frequency. I stored the DX station's frequency in a memory on my radio. When I did not get an answer to a CQ, I would select the stored frequency. If the timing worked out that the DX station was calling QRZ at that moment, I called him. Otherwise I would make another CQ. If I called him but he came back to another station I went back to my CQ frequency and tried again later until I was successful. This trick worked several times, but has its hazards.

Early Sunday afternoon, a CT3 (which I needed) was announced on the packet spotting network. I didn't know he was writing down several calls to work after each QRZ. Apparently he had me on his minilist a couple of times but I didn't know it. When we were both finally in sync he read me the riot act. Use this trick with caution!

NB9C thought another major advantage of packet was in monitoring propagation. You can stay on 20 in the morning knowing that when 15 and 10 start opening up, announcements will start appearing for those bands. Scot also thought it was great on the low bands where gray line openings might only last a few minutes. Packet is also useful for finding out about unusual openings.

W2GD operated the CW weekend of last year's CQWW from P4BGD. He said he could tell when his call was put out on one of the major packet networks by the way his rate jumped way up. John reports times when the 10 QSO rate on the KIEA software he was using for logging would hit 340. I'm sure other contest DXpeditioners love to have their frequency announced on the packet spotting networks.

I found packet a little less useful on CW than on phone. First, I found it nearly impossible to keep a CQ frequency and work a new multiplier someplace else. I had to chose one or the other. The second difficulty was in frequency announcements. On phone the frequency could be off by a kHz and it would still be possible to find the station quickly. On CW it could be difficult to find the DX station if he was weak and there were a lot of strong stations nearby.

One trick I learned to get around this was to note the difference between the announced frequency and the frequency on my rig when I actually found him. I notice that most stations reporting the DX station would be consistently high or low by the same amount, so I kept a note pad with the offsets of the reporting stations. Later when one of these stations reported something I needed I would add or subtract the appropriate offset to the announced frequency to find the DX faster.

A club out for blood could get all of its members together a few days before the contest and select one station as the reference station. He would transmit on some frequency, say, 14025.0, and everyone else would note what frequency their rig showed when he was tuned in. During the contest every operator would compensate for the difference in their rigs to the reference station when they called in a DX spot or tried to tune one in.

During parts of the contests I got a bit annoyed with some of the less experienced contesters and DXers calling in common stuff since it slowed down the whole system. Later I decided that reporting common stuff could help other club members keep the rate up during slow periods. Multi-multis and single-band operators will know all the active DX stations by then. Announcing a new PY or LU that appeared for the first time Sunday afternoon will help others in the same situation keep up the rate. I found a few slow times where I doubled my S&P rate by using the common spots from a multi-multi station on the network.

Packet spotting is still very new. A few clubs have been using it for a couple of years for their multiop stations, but single operator use has only been allowed for a few months. I expect that operating practices will evolve to make even better use of packet spotting.

Thanks to Joe Matt, WA9AQE/3, for suggesting this topic, and to W2GD and NB9C for their thoughts on using packet during contests. □

**Reprinted from an article appearing in the NCJ Journal by Gary Sutcliffe, W9XT*

Mouse Driver Problem with InstantTrack...

Microsoft Software Found to Cause Intermittant Problems

Some InstantTrack users have recently discovered a problem where the map "goes away" or "freezes" when they use their mouse. InstantTrack's author Franklin Antonio (N6NKF) has determined that this problem is a result of a conflict with the Microsoft mouse driver [MOUSE.COM] versions 7.00, 7.01, 7.02, and 7.03. Changing to a mouse driver version earlier than 7.00 or later than 7.03 is the cure. An update of InstantTrack is not required to resolve this problem.

Microsoft is aware of the problem, as it occurs with many programs other than InstantTrack. InstantTrack users who are experiencing this problem should contact Microsoft and ask to obtain version 7.04 of MOUSE.COM.

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(cont'd from "The Publisher's Shack")

LanLink Application Notes by Joe Kasser, G3ZCZ will give you information on using his popular shareware program in various applications.

The IBM Arena by Jon Mayo, KR3T will address topics of particular interest to those of us who operate computers in the MS/PC-Dos environment.

Norman Sternberg's column is back to being titled, DATACOM. This will allow greater flexibility for topics covered in the various areas of digital communications.

All-in-all, the Digest has again gotten bigger -- and hopefully you will agree -- better. I wonder if there is any definition on where a newsletter ends and a magazine begins. We originally planned the Digest as an 8 page newsletter, however by the time the first issue hit the mail, it was 20 pages... and has now nearly doubled! Guess we can say the Digest is a "newsmagazine." In any case, we hope you are enjoying the publication and thanks for your continued support.

Til next issue... see you on the ham bands, digitally speaking, of course!

73, Tom / WA8DXD

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(cont'd from page 19)

modems. AEA's exclusive SIAM™ (Signal Identification and Acquisition Mode) is also vastly improved in the DSP, providing signal analysis of audio inputs that are unmatched. Another unique feature of the DSP is that every known frequency pair of FSK tones have been programmed for the unit.

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Frequency Division Multiplexing. Another commercial coding scheme, FDM sends the different data flows over separate subcarriers, each at a different frequency.

PRICING AND AVAILABILITY
The anticipated delivery of the DSP-1232 and DSP-2232 is fall 1990 with pricing to be announced.

For more information on these and other AEA products, contact Advanced Electronic Applications, Inc., P.O. Box 2160, Lynnwood, WA 98036 or call (206) 775-7373.

(cont'd from page 29)

Following the FAT(s) is the root directory. The root directory is were the names of the files (commonly called filenames) contained in the root directory are listed. Under DOS, a filename can have up to eight characters, a period, and a three character extension (i.e. PROGRAM.EXE). The root directory also contains the names of other subdirectories contained on the disk. The root directory can contain from 64 to 224 filename or subdirectory entries, depending on the type of disk.

Hard Disks

Hard disks are also called fixed disks, rigid disks, and winchester drives. A hard drive is a high capacity storage device that is similar to floppy disks in many ways. A typical hard drive used on an IBM-PC contains between 20 and 150 megabytes of storage space. Having this much storage space necessitates a more complicated DOS management system.

Physically, a hard drive consists of several rigid platters and double the number of read/write heads (one for each side of each platter) encased in a sealed box. Because hard drives store so much information, their magnetic surfaces are of very high quality. In addition, they rotate at a much higher speed than floppies (300 RPM vs 3600 RPM).

Formatting a hard drive requires three separate steps. First come the low level format. This is done using software supplied with the disk or contained in ROM on the hard drive controller card. The low level format divides the disk into cylinders (the hard drive equivalent of tracks) and sectors. A typical hard drive has approximately 300 cylinders and 17 sectors per cylinder. The number of platters, the number of cylinders per platter, and the number of sectors per cylinder determine the total storage space available on the drive.

The next step is partitioning which is done using DOS' FDISK program. FDISK is used to divide the disk into partitions. Most IBM-PC users elect to use the entire hard drive as a PC-DOS disk, but it is possible to use the same hard drive with multiple operating systems, such as Xenix and CP/M-86. With FDISK, the portions of the hard drive that will be available to PC-DOS are defined. FDISK can also be used to view currently defined partition information.

A hard drive can be divided into one or more DOS partitions, and each partition will be assigned a logical drive designation beginning with the letter C. In older versions of DOS, the maximum partition size was 32 megabytes, so drives with larger capacities had to be partitioned into smaller logical drives. Current versions of DOS support single partitions in excess of 32 megabytes.

FDISK records all this information in the Master Boot Record (MBR). The MBR indicates where the operating system begins on the disk, how big it is, and weather it is currently active. The MBR is stored on the very first sector of the disk.

After partitioning the disk, a high level format is done using the DOS FORMAT command, the same program used to format floppies. FORMAT once again creates a DOS Boot Sector and a FAT for each DOS partition. The primary partition, usually on the boot drive C, contains the DOS system files necessary to boot the computer. Each partition also has a root directory, as with floppies.

DOS

Throughout this article I've been referring to DOS. DOS, Disk Operating System, is the program, or programs, that supervise and direct the operation of the computer. The standard DOS that I've been mentioning is PC-DOS which is basically the same as MS-DOS. Microsoft developed the DOS for the IBM-PC when it was first released. IBM licensed DOS from Microsoft and sell it as PC-DOS. Microsoft also sells the DOS as MS-DOS. There are many MS-DOS packages that have been customized for particular computers. For example, there is a MS-DOS for Zenith computers. These customized versions do not differ greatly from the standard PC-DOS. I use PC-DOS, MS-DOS, and DOS interchangeabley and dos to refer to any disk operating system.

Part of DOS, the BIOS, is stored in ROM in the computer. The remainder of DOS comes stored on disks. There are three main files that are required to be present for DOS to operate. These are IBMBIO.COM, IBMDOS.COM, and COMMAND.COM on the PC-DOS operating system. The same files are called IO.SYS, MSDOS.SYS, and COMMAND.COM on the MS-DOS operating system. IBMBIO.COM, and its MS-DOS equivalent IO.SYS, is an extension of the ROM BIOS and contains routines for controlling and communicating with peripherals. IBMDOS.COM and MSDOS.SYS contains file handling routines for both disks and other peripherals.

COMMAND.COM is the Command Processor. It contains many routines for processing commands entered by the computer's user. It is COMMAND.COM that presents the C> prompt. There are two parts to COMMAND.COM, one is memory resident and the other is transient. The memory resident portion always remains in memory, and the transient portion is loaded into memory but is removed if the memory space is needed by another program. The transient portion contains several of the common DOS commands such as DIR and COPY.

If you were to look at the root directory of a DOS boot disk, you would see COMMAND.COM, but not the other two files. The other two files are hidden files. A file can have up to four attributes: system, hidden, read-only, and archive. A file with the hidden attribute set will not show up on any directory listings. Likewise, a file with the read-only attribute set cannot be altered by DOS. The DOS package also includes many programs that are very helpful for managing files under DOS.

Conclusion

In this Premiere installment, I have tried to provide some general background information on the IBM-PC standard. In future installments, I will cover amateur radio digital communications applications related to the IBM-PC. You can expect to learn about both hardware and software as well as operating techniques, tips, and ideas.

Feel free to contact me if you have any comments regarding this column. Contact me via CompuServe (my ID is 72276,2276) for the quickest response. □

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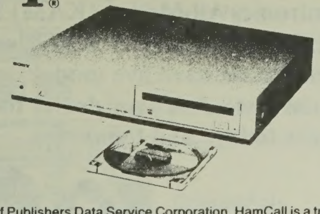

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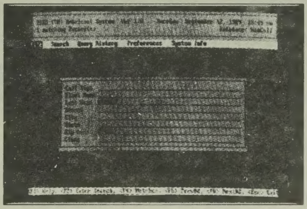

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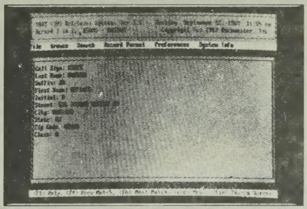

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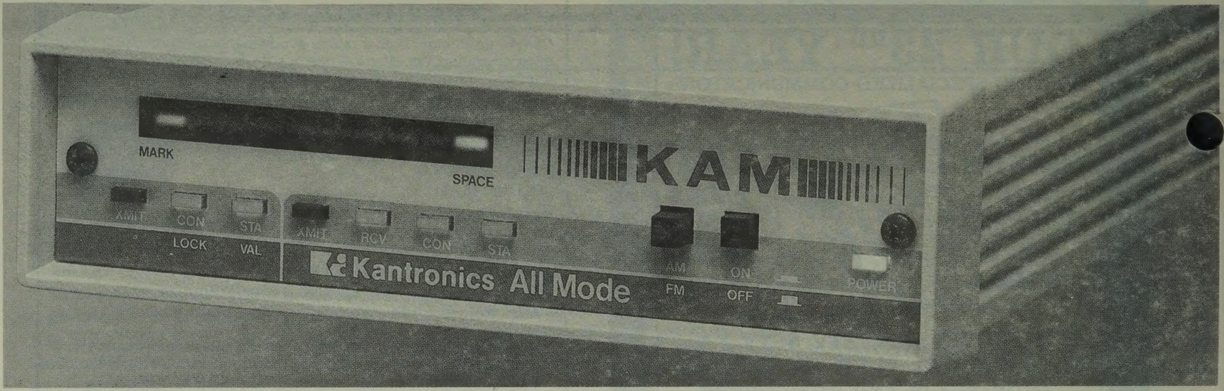

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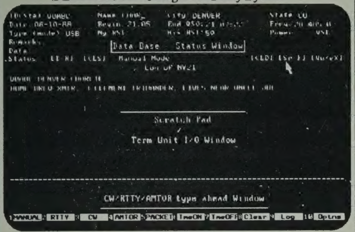

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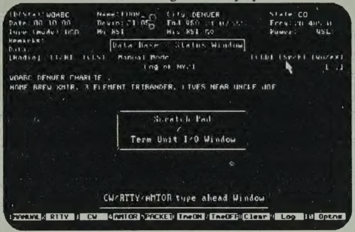

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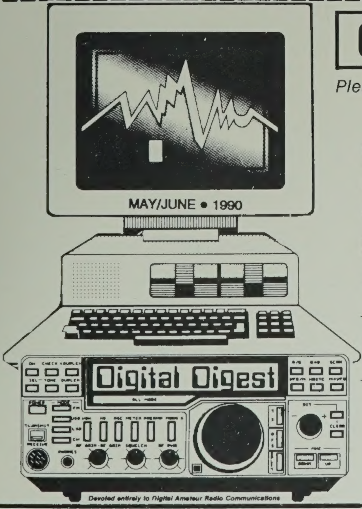
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